TECHNOLOGY L

SEPTEMBER 15, 1957

Telephone Engineer

AND MANAGEMENT

THE NATIONAL TELEPHONE MAGAZINE

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DETROIT

#18

FEATURING IN THIS ISSUE

- ★ EARTH BORING EQUIPMENT SAVES TIME AND MONEY
- ★ RURAL DISTRIBUTION WIRE — PROTECTION REQUIREMENTS
- ★ SOUTHERN BELL'S YEAR-ROUND AIR CONDITIONING SYSTEM
- ★ MODERN CABLE CONSTRUCTION — MESSENGER STRINGING DATA

1 out of 13

OHIO DIVISION
IS ONE OUT OF THIRTEEN DIVISIONS

OHIO DIVISION BUILDING

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CUT HANDSET LOSSES . . . on Coin Collector Telephones

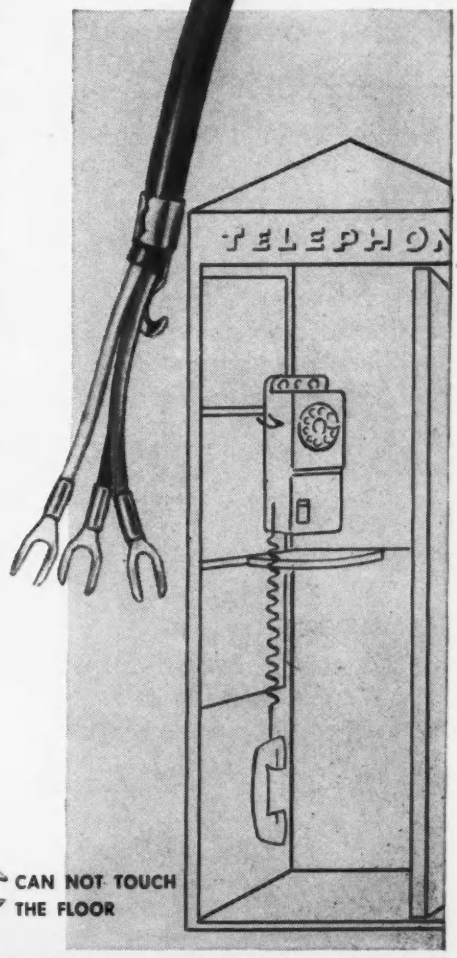
KOILED KORD ILLUSTRATED IS ACTUAL SIZE

These new short KOILED KORDS retractile cords allow sufficient length for use in telephone booths but are short enough to prevent the handset from hitting the floor if dropped.

Figure your past losses from broken handsets and you'll see how much these new short KOILED KORDS can save you.

These new short KOILED KORDS are available for Automatic Electric, Stromberg-Carlson and Western Electric handsets.

KOILED KORDS, the original retractile cords, are the result of 17 years of research, development and use.



CAN NOT TOUCH THE FLOOR

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Koiled Kords INCORPORATED, BOX K, NEW HAVEN 14, CONN.

OF THESE 3 TYPES OF

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DIRECT BURIAL WIRE

...one will "do the trick" for you!

Buy SUPERIOR DIRECT BURIAL WIRE to match the requirements of your installation!

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1 **Need wire having maximum resistance to damage from road or farm machinery and implements . . . or other similar sources?**

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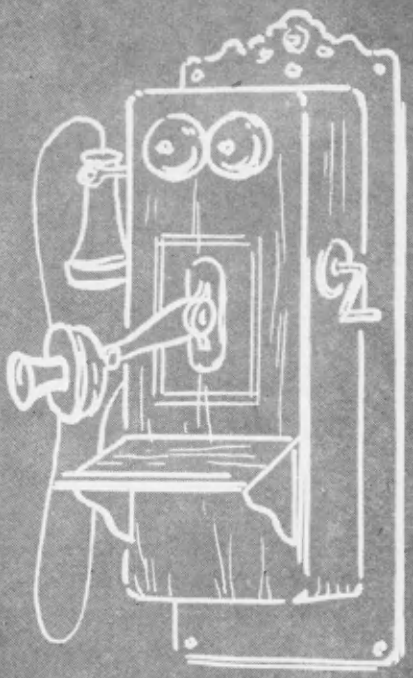

1897

60th ANNUAL CONVENTION

CONRAD HILTON HOTEL

CHICAGO

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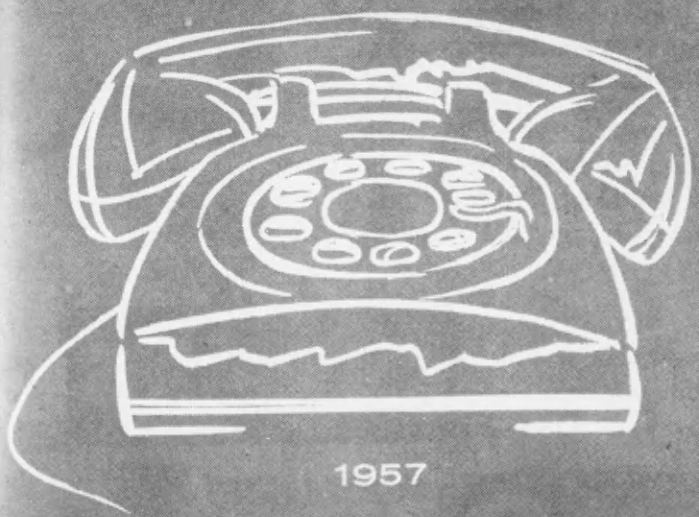

1957

Helping you offer wider service to business and industry

Today, communications companies are able to offer more service – to more people – because of new and varied uses of Teletype equipment.

For example: office automation, coordinated production lines, reliable news transmission, data channels for computer centers – all these make use of Teletype equipment's ability to accurately and rapidly transmit and reproduce text and punched tape.

These new uses for Teletype equipment are providing an important source of revenue for communications companies all over the country.

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1957 Golden Anniversary Year

Digging Equipment 43

With costs rising it has become more necessary than ever to employ labor-saving machinery. Nothing much can be done about the cost of materials such as poles, crossarms, line hardware, insulators and wire or cable, but it is possible to control labor costs by the use of the equipment described by this timely article.

Rural Distribution Wire 49

Rural distribution wire is exposed to the same hazards of lightning and power contacts as open wire and requires corresponding protective measures. At the same time, the support wire requires effective grounding as additional protection for the circuits carried in the distribution wire. Part III of TE&M's Operating Manual on Rural Distribution Wire outlines suggested protective and grounding procedures.

Year-Round Air Conditioning 47

Since 1955 Southern Bell's central station air conditioning system has been proving its value. This article tells how the system works and how it has helped — (1) reduce dial circuit troubles, (2) raise employe morale and efficiency, and reduce building maintenance costs.

Modern Cable Construction 71

The use of short spans of telephone cable results in high construction costs and many companies are now applying long span principles to their cables wherever possible. Chapter X-A of Mr. Reed's article on "Modern Cable Construction" tells why the practice is considered to be a cost saving advantage where small cables are involved.

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Telephone Engineer

AND MANAGEMENT

THE NATIONAL TELEPHONE MAGAZINE

VOL. 61 No. 18 SEPT. 15, 1957

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FRONT COVER

There were "Too Few Telephones" in Pennsylvania Bell's Wilkes-Barre District when "TFT" campaigners started to work to correct the condition. Shown with some of the campaign literature and "props" are from left: MIRIAM BOWEN, SALLY KLEIN, IRENE KASCAK, and EMILY KELLER. For complete story see "Revenue Boosters," page 26. (Photo From "The Telephone News.")

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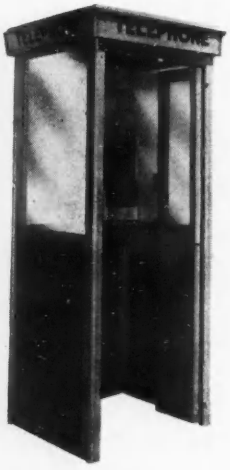

the **BN Booth**

attracts the eye day or night, promotes more revenue. Colorful, clean, sturdy—the BN Booth is best for you, too!

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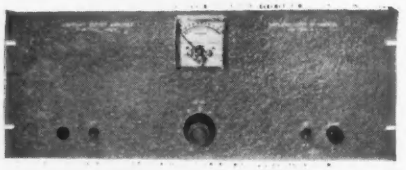

Specifically designed for constant level amplification of telephone circuits. Prevents overloading of telephone lines and avoids loss of low level signals. Maintains constant output within ± 1 db with input changes of 30 db. Provided with a double scale meter and transfer switch to indicate degree of compression or output level. Exceedingly rapid automatic gain reduction time prevents syllable clipping. Slow automatic gain increase avoids automatic control at syllabic frequencies.

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S/N RATIO	60 db
HUM AND NOISE	—60 dbm
INPUT IMPEDANCE	600 ohm c.t.
OUTPUT IMPEDANCE	600 ohm c.t.
LINE VOLTAGE	117 volts, 50/60 cycles
DIMENSIONS	19" x 7" x 8¾"

For complete technical specifications and direct factory prices write to Dept. TE:

AMPLIFIER CORP. of AMERICA
398 Broadway, N. Y. 13, N. Y.

COMING CONVENTIONS

ARKANSAS Telephone Association, Arlington Hotel, Hot Springs, Sept. 16-17.

MICHIGAN Independent Telephone Association, Hotel Pantlind, Grand Rapids, Sept. 17-19.

ROCKY MOUNTAIN Telephone Association, Hotel Utah, Salt Lake City, Sept. 18-20.

WEST VIRGINIA Independent Telephone Assn., Blackwater Lodge, Davis, Sept. 30-Oct. 1.

NORTH CAROLINA Independent Telephone Association, Carolina Hotel, Pinehurst, Oct. 3-4.

UNITED STATES Independent Telephone Association, Conrad Hilton Hotel, Chicago, Oct. 14-16.

VIRGINIA Independent Telephone Association, Roanoke Hotel, Roanoke, Oct. 24-25.

SOUTH CAROLINA Independent Telephone Association, Clemson House, Clemson, Nov. 4-5.

ALABAMA-MISSISSIPPI Telephone Association, Thomas Jefferson Hotel, Birmingham, Nov. 11-12.

GEORGIA Telephone Association, General Oglethorpe Hotel near Savannah, Georgia, Nov. 13-14.

OKLAHOMA Telephone Association, Huckins Hotel, Oklahoma City, Nov. 21-22.

FLORDIA Telephone Association, The Balmoral, Bal Harbour, Miami Beach. Dec. 2-3.

LOUISIANA Telephone Association, Jung Hotel, New Orleans, Feb. 12-13, 1958.

MINNESOTA Telephone Association, St. Paul Hotel, St. Paul, Feb. 17-19, 1958.

TEXAS Telephone Association, Baker Hotel, Dallas, March 3-4, 1958.

KENTUCKY Telephone Association, Phoenix Hotel, Lexington, March 4, 1958.

IOWA Independent Telephone Association, Hotel Fort Des Moines, Des Moines, April 8-9, 1958.

OHIO Independent Telephone Association, Deshler Hilton Hotel, Columbus, April 14-16, 1958.

NEBRASKA Telephone Association, (Hotel not announced), Omaha, April 22-23, 1958.

INDIANA Telephone Association, Claypool Hotel, Indianapolis, May 7-8, 1958.

WISCONSIN State Telephone Association, Hotel and location to be announced. May 14-15, 1958.

ILLINOIS Telephone Association, Hotel Pere Marquette, Peoria, May 21-22, 1958.

PENNSYLVANIA Independent Telephone Association, Bedford Springs Hotel, Bedford, May 26-28, 1958.

NEW YORK Telephone Association, Scaroon Manor, Schroon Lake, June 16-18, 1958.

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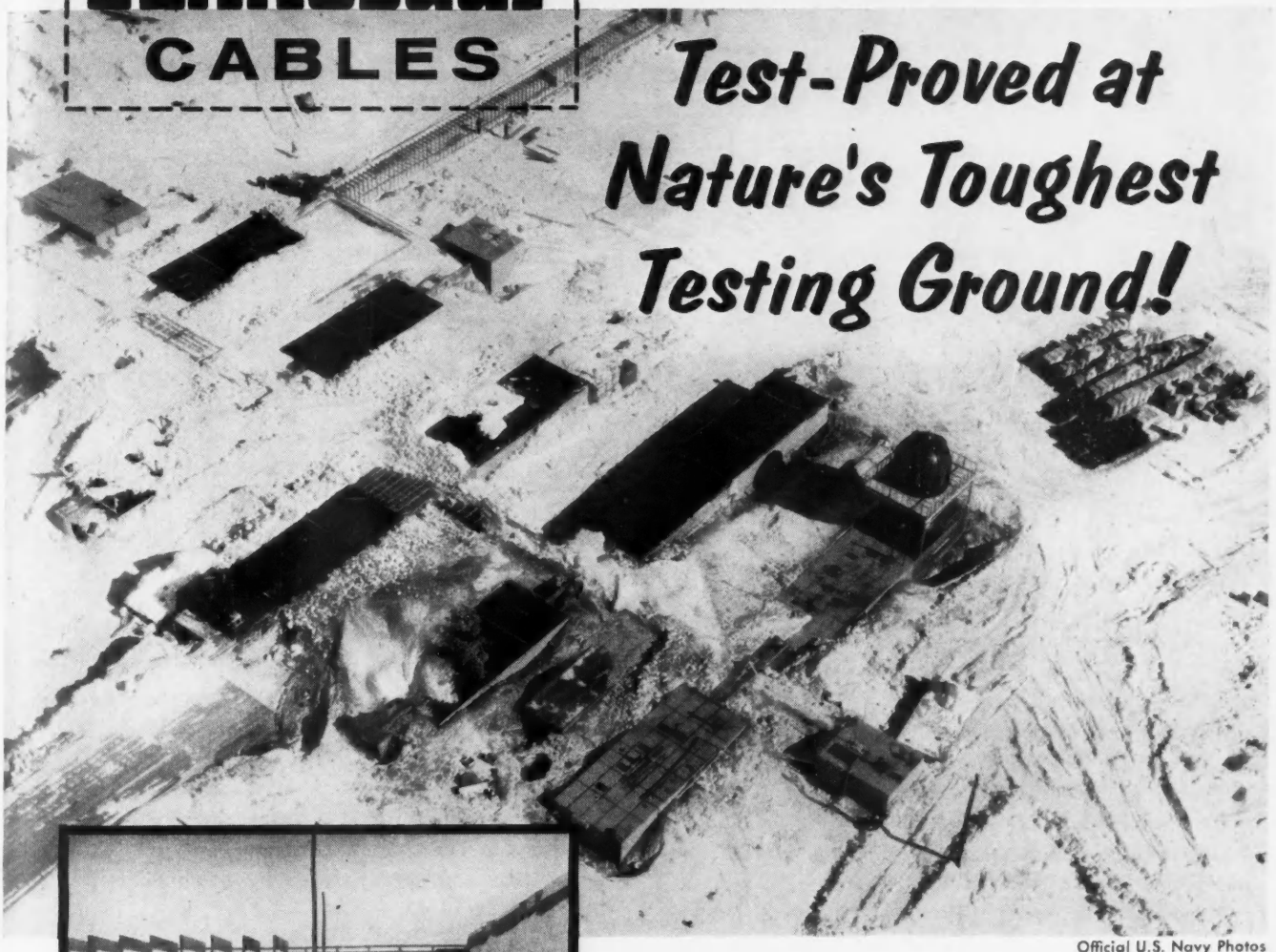
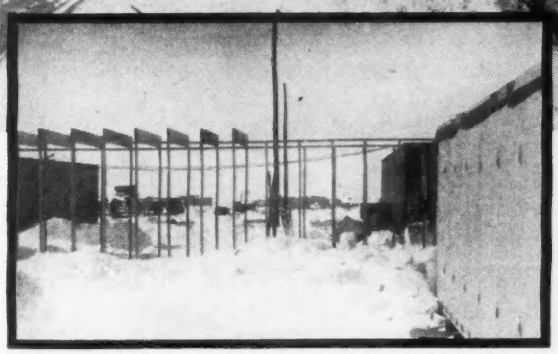
Test-Proved at Nature's Toughest Testing Ground!





Official U.S. Navy Photos

In Antarctica, reliable communications are vital to the success of Operation Deepfreeze. The lives of men and the safety of equipment *demand* accurate transmission of information and instructions.

Ankoseal Rural Distribution Wire was specified for telephone, intercom and control circuits because it is simple to install, easy to maintain, and adaptable to emergency service. Indoors at Little America V, this versatile wire is strung from rafters in snow covered tunnels and buildings . . . outdoors it is strung on poles and sometimes it is simply laid on the snow. Under all conditions this Ansonia wire has passed every rigorous test!

Ansonia Ankoseal Cables are engineered to meet your most exacting requirements. They are built up to a standard, not down to a price. Whenever you require *dependability* . . . specify *Ansonia Ankoseal Cables.*

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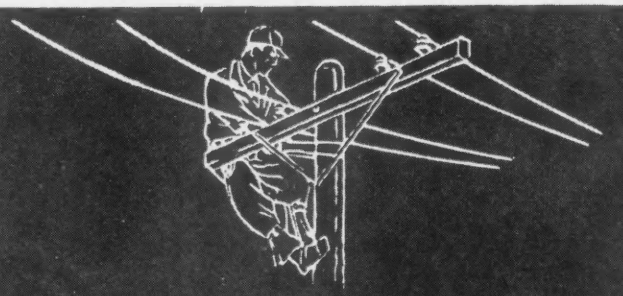
INDUSTRY NEWSLETTER



USITA 60th Anniversary Convention

UNITED STATES Independent Tel. Assoc. (USITA) reports its big 60th Anniversary convention will be the grand finale of USITA's Anniversary observance. Convention will be held Oct. 14-15-16 at Conrad Hilton Hotel, Chicago, Ill. According to USITA Executive Vice President, Clyde S. Bailey, "there will be a lot of unusual features at this year's annual gathering . . . The Association has made elaborate plans and gone to much expense in effort to make the 1957 convention the outstanding meeting of its history, and one which will long be remembered by those who attend."

"There will be excellent speakers of national repute, extra special exhibits by our manufacturers & suppliers, a banquet and entertainment, the customary bang-up meeting & show of the Pioneers, & the usual four departmental conferences, *plus* an *engineering conference*," Mr. Bailey said. "The registration is expected to surpass last year's all-time record (3,060) & of necessity, it will have to be a case of first come, first served. For this reason, may we suggest that if you have not already done so, you *make your hotel reservations at the earliest moment*. Be sure to inform the hotel that your reservation is required in connection with your attendance at the convention."

Advance Registration Plan: — If you want to avail yourself of the advance registration plan & save time in obtaining your badge & copy of program, send names, titles, & addresses of representatives of your company who are to attend convention, together with names & addresses of members of their families & friends who will accompany them to *United States Independent Telephone Association, 438 Pennsylvania Bldg., Washington 4, D. C.*

How to Buy Banquet Tickets: — Again this year there will be no advance sale of tickets to banquet. Banquet ticket desk will open Sunday afternoon, Oct. 13 at 1:00 p.m., & remain open until 3:00 p. m. on Tuesday, Oct. 14. Each ticket will have table number printed on it, but location of table cannot be determined until afternoon of Tuesday, Oct. 14, preceding banquet. Thus late arrivals will be on parity with early arrivals. Price of tickets will be $10 each.

Michigan Bell To Trim Capital Outlays

MICHIGAN Bell Tel. Co., will reduce its $193 million capital expenditure program for 1957 & 1958, William M. Day, president announced last month. He said company is forced to cut spending for new construction & improvements because of ruling by Michigan Public Service Commission which disapproved proposed hike in rates of $12,500,000 annually. Commission instead approved increase of about $2,800,000.

"We must somehow, some way achieve higher earnings if we are to continue to attract the capital so necessary for our construction program," Mr. Day said. He added that increase approved by commission is "too limited to be of much help."

Rate Adjustments

LYKENS (OHIO) TEL. CO., serving approximately 168 stations & Hopedale Tel. Co., serving approximately 639 stations, have applied for authority to increase rates . . . Rate increase application of Van Buren (Ohio) Tel. Co., serving approximately 244 stations, has been approved by Ohio Commission. Record of case showed reproduction cost new of $65,599.06. Observed depreciation amounted to $23,371.00 which resulted in rate base of $42,228.06. Company's income available for fixed charges was a minus figure prior to institution of new rate treatment & income for fixed charges following rate case is $961.60. Rate of return on rate base of $42,228.06 is 2.28 per cent.

New Owners

HOME TEL. CO., Fairview, Ohio, serving approximately 1205 stations received permission to purchase Batesville Tel. Assoc., Inc., serving approximately 122 stations, for $12,000 — $6000 to be paid in cash on closing date & remaining $6000 to be paid on date of disconnection of last subscriber from Batesville exchange . . . Minford (Ohio) Tel. Co., serving approximately 280 stations has been authorized to purchase

go modern!
handle
lighter cable!

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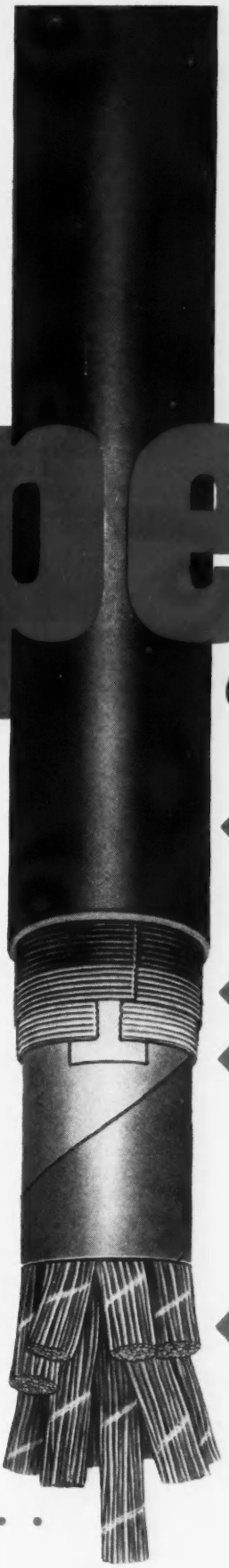
TELEPHONE CABLE



Extruded, high-molecular-weight, moisture- and weather-resistant polyethylene jacket.

Corrugated coated steel tape applied longitudinally with overlap seam continuously soldered.

Corrugated aluminum shield applied longitudinally over cable core.

Paper insulated copper conductors.

Economical, yet having superior moisture and corrosion resistance...light weight permits longer spans with resulting savings in pole line costs or reduction in messenger strand size and associated pole supports...easy to handle...fewer splices on duct runs because of longer pull-thrus on large size cable. Another outstanding product of more than 75 years of General Cable experience and know-how in manufacturing techniques!

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3 GRADES • EACH IN 2 SIZES (.065 and .045)

Type 430 • for use with galvanized messengers
Type 302 • for use with stainless messengers
Type 316 • for use under severe corrosion conditions

Furnished six coils in cardboard carton (minimum order).

Other fine-quality products • You can depend upon PAGE Strand (Stainless or Galvanized Steel) and PAGE Stainless Dead-End Wire • See your Telephone Supply Distributor, or write our Monessen, Pa., office.

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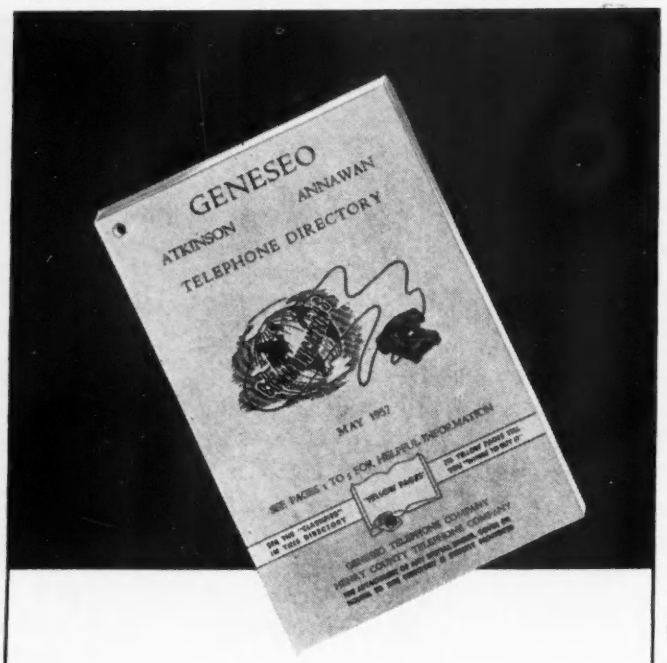

A directory for the
Geneseo Telephone Company, Geneseo, Illinois
printed by

R. R. DONNELLEY & SONS COMPANY

350 East Twenty-second Street, Chicago 16

Newsletter

(Continued from page 10)

Tri-County Tel. Co., Stockdale, Ohio, serving approximately 107 stations. Minford company also was authorized to issue its 4 per cent certificate of indebtedness in exchange for presently issued & outstanding notes & obligations of Tri-County Tel. Co. Remaining balance from sale of certificates of indebtedness will be sold for cash.

Beaver Valley Tel. Co., which serves Bartlett, Neb., & surrounding territory, has been sold to Nebraska Tel. Co., South Sioux City. System will be rebuilt for dial service, following approval of transfer & REA approval of a loan for rebuilding . . . Ruthton (Minn.) Tel. System, purchased by Bernard Knuth from Chris Anderson . . . Midstate Tel. Co., purchased Delmont (S.D.) Tel. Co., from W. A. Pirner . . . Bunker Hill Mutual Tel. Co., Woodburn (Ill.) has been purchased by Midland Tel. Co., Champaign, Ill. . . . Sale of Aumsville (Ore.) Mutual Tel. Co. to Lowell Brown, Silverton, Ore., has been approved by Aumsville stockholders.

Expansions & Improvements

NASH TEL. CO., Damariscotta, Maine, completed $587,000, five-exchange conversion project . . . Galva (Ill.) Tel. Co., completed cutover to new dial system . . . Midwestern Tel. Co., Warrenton, Mo., is in midst of expansion program that calls for estimated expenditure of $625,000, according to announcement made by J. C. Torbett, pres. & general mgr. . . . Rochester (N. Y.) Tel. Corp., took another step forward Aug. 18 in its 13-year job of converting manually-operated phones to dial. On that date company cut in FRontier and LUdlow exchanges serving East Rochester, Pittsford, Fairport & part of present HIllside exchange. About two-thirds of company's 262,000 telephones are dial-operated. In past six years, company has spent more than 41 million dollars on its dial conversion & modernization program . . . Jasper (Minn.) Tel. Co., completed dial cutover at Jasper . . . Palestine (Ill.) Tel. Co., completed $440,000 dial conversion project.

REA Loans

RURAL ELECTRIFICATION Administration made following telephone loans last month: Citizens Tel. Co., Inc., Leslie, Ga.; $310,000 first loan. C. Smith is pres. of Citizens Tel. Co. . . . Aberdeen (Idaho) Tel. Co.; $62,000, third loan. S. Festus Monsen is pres., and mgr. of Aberdeen Tel. . . . Citizens Tel. Cooperative (formerly Citizens Mutual Tel. Co.), Floyd, Va.; $600,000, second loan. John T. Harmon is pres. & William R. Dunn is mgr., of Citizens Tel. Cooperative . . . . Chester Tel. Co., 53 Amory St., Manchester, N. H.; $315,000, second loan. John S. Rand is pres. of Chester Tel. Co.

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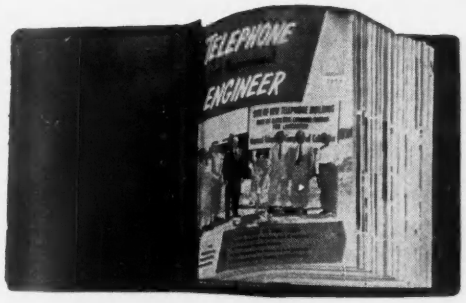

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● Operated by a rachet handle requiring no more effort than an automobile jack. Objects up to 12,000 lbs. can be lifted or pulled . . . vertically, horizontally or at any angle. Anyone can operate. Automatic brake holds loads at any point. Inexpensive. Sturdy. Safe. CM-Alloy flexible welded load chain.

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DISTRICT OFFICES: NEW YORK, CHICAGO, CLEVELAND
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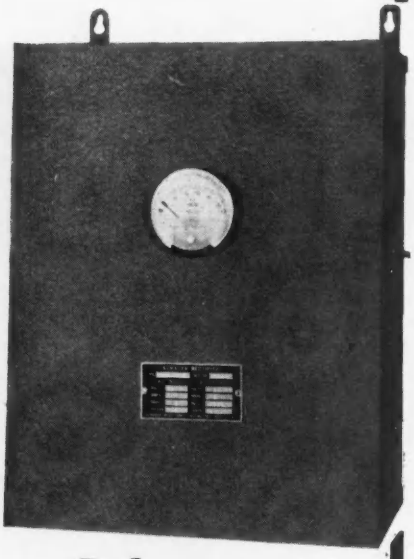
for Years-
and Years-
and Years-
of Service!



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REVENUE BOOSTERS

"TFT" — (Too Few Telephones)

IN WILKES-BARRE, Pa., a citizen was getting a haircut when a friend walked into the barber shop, looked at the customer's thinning hair, and remarked, "T-F-T."

"Come again?" said the barber.

"Time for Toupee," was the answer.

The man in the chair, a telephone man, laughed loudest, according to the newspaper that gaily reported the incident.

The joke was just one of many good-natured witticisms that came out of the Wilkes-Barre District's "Too Few Telephones" campaign. According to Pennsylvania Bell, before the six-week sales effort was over, the key letters of the campaign were as readily recognized locally as Wilkes-Barre's own initials.

In the cities of Wilkes-Barre and Nanticoke and the rest of the District you couldn't escape the fact that some 800 telephone people, the entire personnel, were working hard (and having fun, too) on what the press described as "a unique test in merchandising telephone service to the public, an experiment designed to make the residents of that section of the Wyoming Valley aware of new concepts of convenience, comfort, privacy and decor in the modern home by relating the telephone to these factors."

"We made the most of this potential," Arthur Napier, Wilkes-Barre district manager, said, "with an imaginative saturation advertising and publicity campaign and an enthusiastic sales force."

Underscore the word *enthusiasm!* By the time the drive ended, Wyoming Valley was wearing 10,000 big TFT lapel buttons (a TV announcer said somebody had pinned at least one on every suit he owned) and at headquarters they chanted an original TFT calypso song.

"We had no quota," Manager Napier said, "but when we installed the thousandth telephone, we passed the expectations of many."

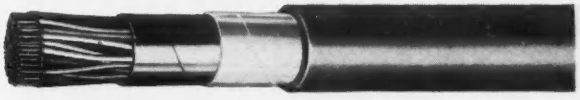
As this is written, residents of TFT Valley, as some were calling it, had ordered additional telephones since the start of the drive, and were still thinking up new TFT jokes.— *"The Telephone News"*

BUTTON-HOLING HIS HONOR, Mayor LUTHER KNIFFEN of Wilkes-Barre, with a TFT lapel decoration, BUDD VAN HORN (right), general co-ordinator of Campaign, gets sales drive off to a flying start.

REX

TELEPHONE WIRE & CABLE *for all needs...*

Aerial and Duct are R. E. A. listed. Both Aerial and Duct and Direct Burial Cable utilize polyethylene insulation, aluminum shield and high molecular weight polyethylene jacket for top electrical values. Available in #26, #24, #22, or #19 AWG in 6 through 404 pairs.



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Conductors insulated with high molecular weight polyethylene and jacketed with color coded, weather resistant vinyl provide good transmission values at low cost. Available in either #19 or #22 AWG with 3, 6, 11, or 16 pairs cabled over a high molecular weight polyethylene insulated high strength galvanized support wire.

RURAL DISTRIBUTION WIRE

The rugged weather resistant vinyl insulation over the conductors is fully color coded. This construction, designed for block distribution, serves best where low cost rather than low attenuation is the prime consideration. Available in #24 AWG with 6, 11, or 16 pairs.

URBAN DISTRIBUTION WIRE

A high molecular weight, weather resistant polyethylene extrusion encompasses the parallel conductors. A raised ridge tracer provides polarity identification. The high strength conductors make possible long spans on lateral branches or drop runs. Available in #14 or #12 Copperweld or .083 galvanized steel.

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Solid, soft drawn bare copper conductors fully color coded with heat resistant polyvinylchloride insulation. All pairs twisted with varying lays to minimize cross talk and cabled to insure maximum flexibility. A tough, water resistant vinyl jacket in either brown or ivory provides good conductor protection for exposed insulation. Rip cord construction prevents damage to conductors in stripping. Available in #24 AWG with 6, 12, 16, 21, 26, 51 or 76 pairs.

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SEND TODAY FOR THIS CATALOG — CONTAINS COMPLETE DATA AND SPECIFICATIONS FOR ALL REX WIRES AND CABLES.

INDEPENDENT

REX WIRE & CABLE

Manufactured by

THE REX CORPORATION

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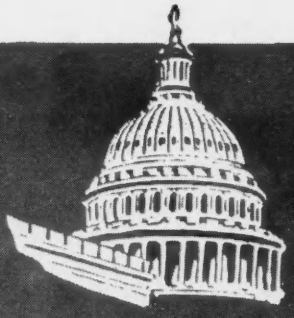
WASHINGTON NEWSLETTER



The 85th Congress

LITTLE OF CONSEQUENCE to the communications industry was accomplished by the 85th Congress during its eight-month-long session, but as adjournment arrived there were still pending several subjects of interest to the non-broadcast field which could be revived when the lawmakers return to Washington next January.

In the final hours of the Congressional session, the rush of bills placed into the hopper included one by Rep. Charles A. Vanik (D., Ohio) that would amend the Federal-Aid Highway Act of 1956 to provide that no federal funds could be used to pay for the cost of relocating the facilities of public utilities. There was, of course, no action taken by the House on this proposal, except to refer it to the Public Works Committee for consideration next year.

Another legislative action which must await 1958 completion is the long-pending excise tax administrative and technical revision bill, which was passed by the House, but still needs to be taken up by the Senate. The bill eliminates excises on all installations of communications services, and removes the present exemption for common carriers of all types from tax on teletypewriter exchange service (but not the private line tax exemption for those companies).

It also makes clear that any private line service, including those wholly within a telephone local exchange area, would be taxable as private line services, thus removing the present levy on such services provided to common carriers and broadcasters.

Among other legislative proposals with a bearing on the telephone industry were the number of bills introduced that would have amended the Fair Labor Standards Act, particularly affecting the wage-hour provisions as they relate to the present 750-station exchange exemption for telephone companies.

Many bills were introduced that would have lifted this exemption completely, but the one that got farthest along in the legislative process was one by Sen. Kennedy (D., Mass.) that would have limited the exemption to telephone operators who work at switchboards located in their homes.

None of the bills got a test vote on the Senate or House floor, but they still could be considered when Congress returns next January.

A number of other developments related to the communications industry were sidelined by committee inaction or were pigeon-holed somewhere along the way. Among these was the perennial legislative request of the FCC for a change in the Communications Act to authorize the imposition of the Commission's rules by common carrier and safety and special radio service licensees.

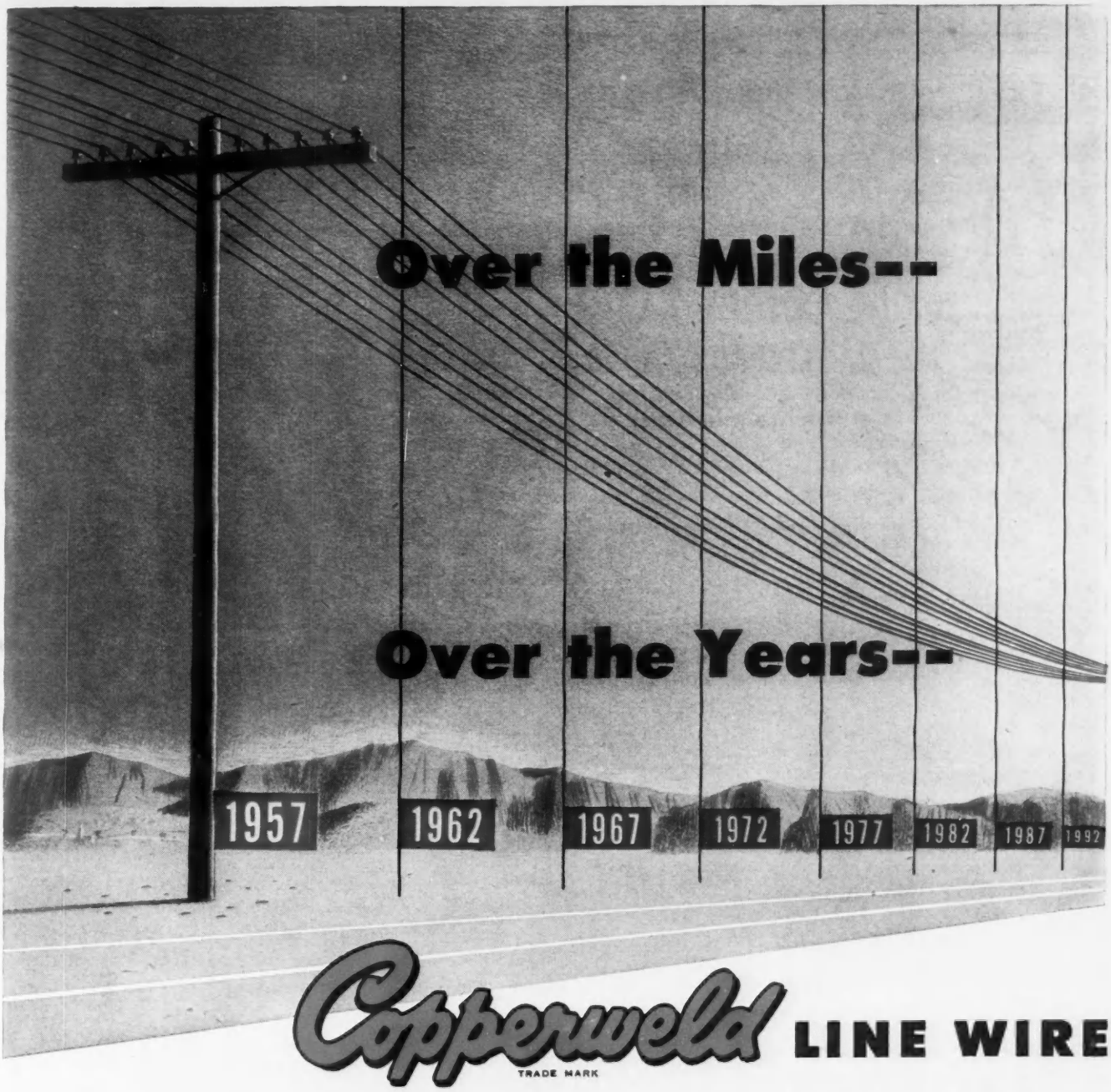
Another was the suggestion that the FCC establish filing and license fees. Still a third traditional bill which never advanced very far would prohibit transmitting gambling data by interstate and foreign communications.

Among other bills which got nowhere was one that would have put federal agencies in the transportation and communications fields, including the FCC, into a new Cabinet department; another which provided penalties for any wilful or malicious act resulting in damage or destruction to communications facilities; and a third that would have created a Department of Civil Defense, with sweeping powers, including control of communications.

Of course, any and all bills which were introduced in the first session can be taken up in the second session at the place where they stood when Congress called it quits for 1957.

However, a long look into the future reveals no strong indication that much of this pending legislation with a bearing on the communications industry will get much farther in 1958.

Civil rights, foreign aid and the budget attracted



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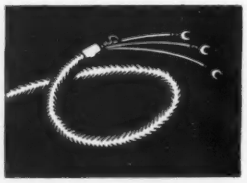

QUALITY CORDS FOR ALL MAKES AND TYPES OF TELEPHONE INSTRUMENTS

most of the attention of the Senate and House in 1957. The civil rights bill was passed, but immediately there were promises by some lawmakers that they will seek to have it amended as soon as the second session begins. And the budget and foreign aid are just two of of several bills which will come up again.

These reasons plus the very realistic fact that 1958 is an election year lend weight to the conclusion that not much "select" legislation will be taken too seriously next year. Congress will undoubtedly want to wind up the second session relatively early, and while the elected officials are in Washington it is a safe bet that they will be directing their attention to two related goals: slashing the budget and cutting taxes.

The excise tax revision bill should get over its Senate hurdle very early in the session, but it doesn't seem likely that amendments to existing laws — such as the highway bill and the wage-hour law — will get much attention.

Telephone Separations Manual

REWRITING the telephone separations manual, to conform to the principles of the "Charleston" and "modified Phoenix" plans of separations adopted by the National Association of Railroad & Utilities Commissioners and authorized by the FCC, an NARUC-FCC staff group has completed its work on the project.

Next step was scheduled to be a study of the revised manual draft by the NARUC Telephone Staff Committee which was tentatively scheduled for the last week in September, probably in Washington. Meanwhile, interested parties, including the telephone industry, were conducting a detailed editorial review of the new manual draft.

The manual rewrite came as the result of a resolution passed at last year's NARUC convention, directing the staff group to prepare a complete revision of the manual, based on the separations principles previously agreed to.

Final meeting on the manual rewrite was held by the task force which handled the job and the NARUC Separations & Toll Rate Disparity Committee in Denver, Colo., in early August. The group reached agreement on the major questions which had been unresolved up to that point, and then discussed its conclusions with Bell System and US Independent Telephone Association representatives who were on hand.

The new manual draft does not change any basic separations principles agreed on earlier, but would make such changes as adding to the number of categories of exchange plant. This, it is felt, will have a long-range effect of shifting a minor amount of investment to inter-state service.

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Visible Card Method for Assignment of Operators' Tours of Duty and Days Off

Standard for the telephone industry and used more than any other method or combination of methods for assigning operators' tours of duty and days off. Record shows the assignments for which an operator is trained, personal preferences, seniority and local working agreements. Holiday and night tours are fairly assigned and, when possible, in accordance with individual wishes. Standardization of the System facilitates transfer from one district to another with up-to-date assignment history, fitting into the system of the operator's new district.

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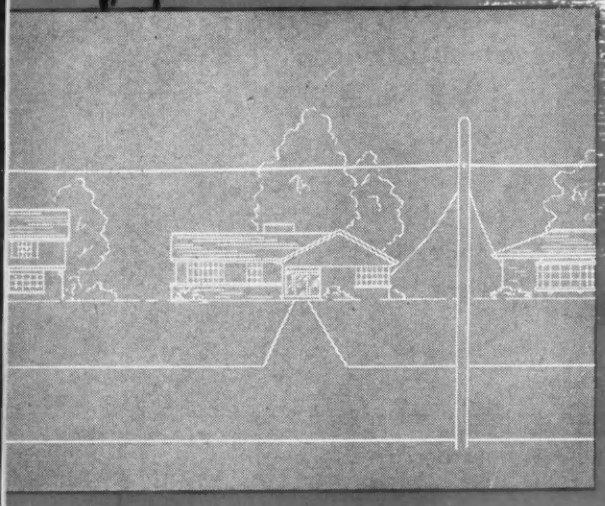

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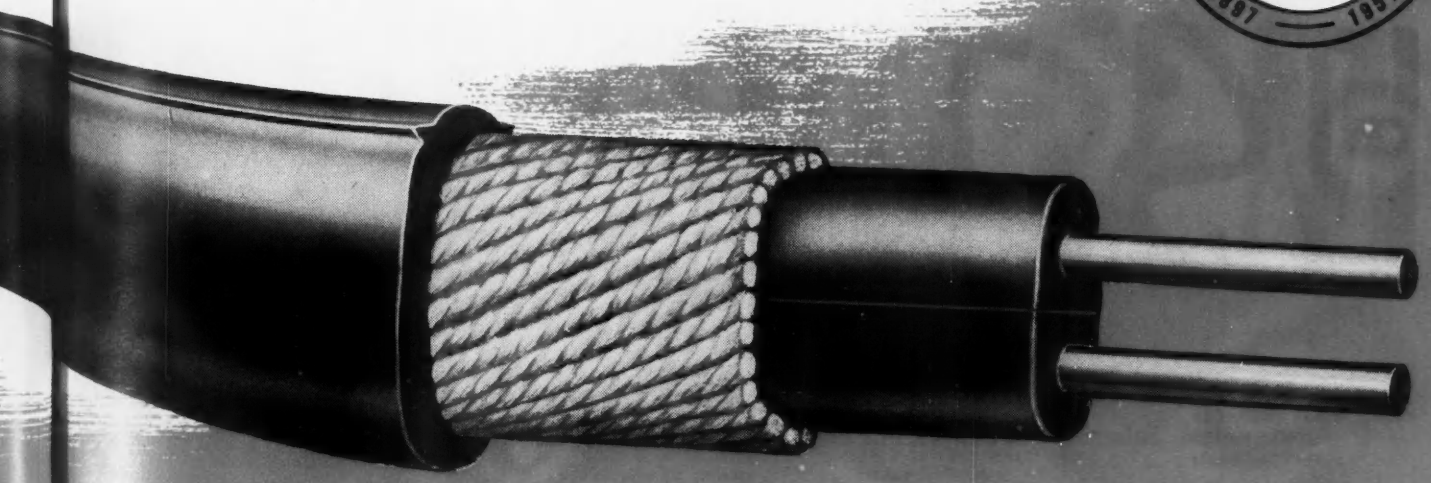

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—you can hold one call while talking on another line. This permits every key telephone user complete operational control.

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—your system can be designed to select as many as four central office or PBX lines, thus affording maximum use at all times.

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It's BIG saleswise. *1A1 Type key systems are selling faster than any other type in the nation. Subscribers in independent areas want the best, too, and they get it with the K1A1.*

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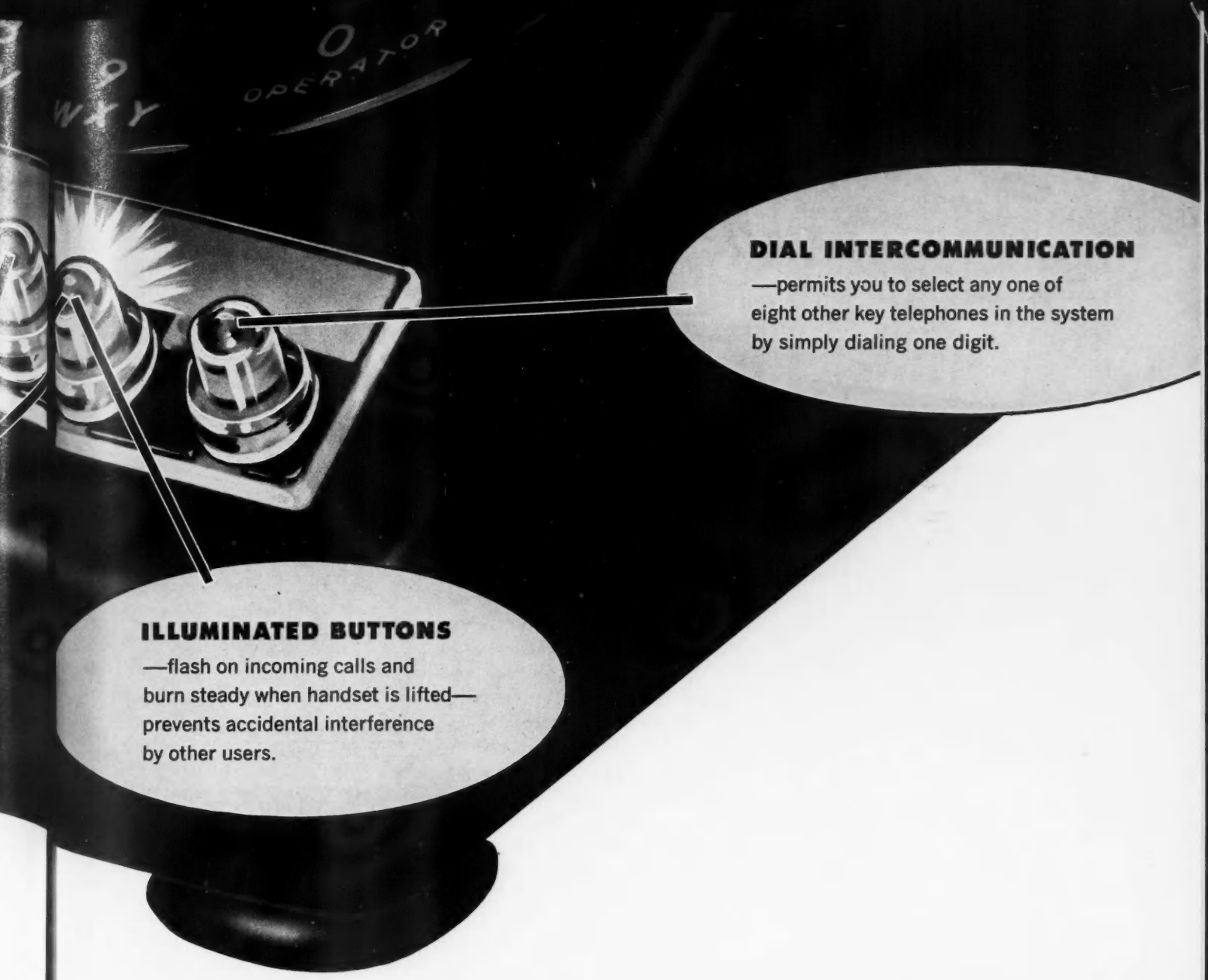
But it's SMALL in size and cost. *The K1A1 key systems is engineered to be easy to install. It occupies a minimum of wall space. And it's rugged equipment . . . maintenance calls are reduced to a minimum.*



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—permits you to select any one of eight other key telephones in the system by simply dialing one digit.

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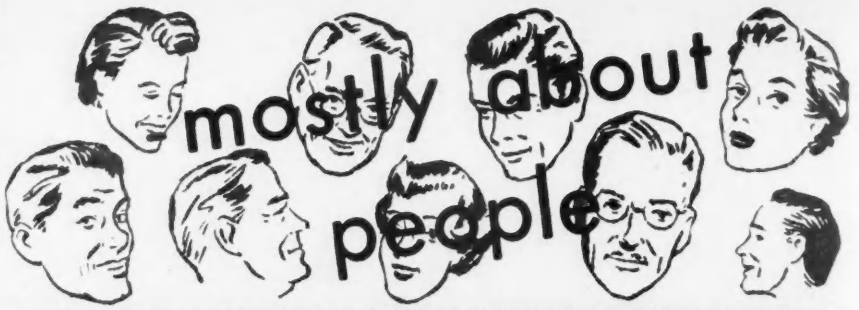

ACROSS THE EDITOR'S DESK

"A Great Success"

INDEPENDENT Telephone Week has been a great success if we judge from the clippings of the newspaper press we are now receiving. Here in Chicago our Mayor *Richard J. Daley* issued a proclamation on September 3. Governors of many states co-operated in issuing proclamations and the press was exceedingly profuse with publicity stories furnished by hundreds of Independents in their areas. USITA President *Donald C. Power* is to be congratulated on the successs of Independent Telephone Week and its inauguration during his term as chieftain of the Independent telephone association.

"60th Anniversary"

THE 60TH ANNIVERSAY of the United States Independent Telephone Association will receive much attention in the Pre-Convention, October 1 issue of this magazine, the next issue you will receive. The official program, the exhibitors and a directory of their exhibit rooms — plus much about the *Past, Present* and *Future* of the telephone industry will be within its covers. We will delay our regular October 15 issue so we may bring you the Convention Report issue, with pictures, with mailing to be dated October 21.

Harold T. McCaig

HAROLD T. McCAIG, one of our favorite gentlemen and a pioneer of some 45 years of service to the telephone industry, died at his home in Berwyn, Ill. on Sept. 1. He served the Stromberg-Carlson Co. for 38 years closing his career in 1949 as Chicago area sales manager. Since that time he has been sales manager of the Lorain Products Co. of Lorain, Ohio. Mr. "Mac" was a regular visitor at our office through the years. Our entire Staff join with Mrs. McCaig and his son and daughter in mourning his passing. We enjoyed his friendship through the years and admired his philosophy of a true Christian life.

Nels A. Anderson

NELS A. ANDERSON, assistant connecting company agent of the Southwestern Bell Telephone Co. since 1951 when the Southwest Telephone Co. of Pratt, Kans. was merged with Southwestern, retired Sept. 1. He was president of the Pratt company. Mr. Anderson started his telephone career in 1908 but left the industry for some years while he served as superintendent of the Boys Industrial School and for 8 years of service on the Kansas Corporation Commission.

USITA Convention

OFFICIALS of the Conrad Hilton Hotel inform us an unusually large reservation list has been made for the coming national 60th Anniversary Convention of the USITA. The Chicago meeting, the largest of all of the telephone conventions held annually will convene October 14. There will be more exhibitors than in any recent year with many planning to open their exhibits the afternoon of October 13, Sunday as many out-of-state delegates are scheduled to arrive early. The officers of the USITA will present an outstanding program in keeping with this 60th milestone of their history.

Announcing

SKILLMAN TYPE UNIVERSAL TRUNK RELAY CIRCUIT

Featuring plug-in mounting for integration on toll switchboards and intertoll switching. The trunk relay equipment may be moved to other locations strapped for other types of operation.

OPTIONS

The options listed below are available in each trunk relay circuit by external strapping of the jack.

Outgoing Calls

With operator ring control
Without operator ring control
Auto from intertoll
Pad switch

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Without operator ring control
Auto to intertoll selector

Construction

Plug-in using 32 point jacks

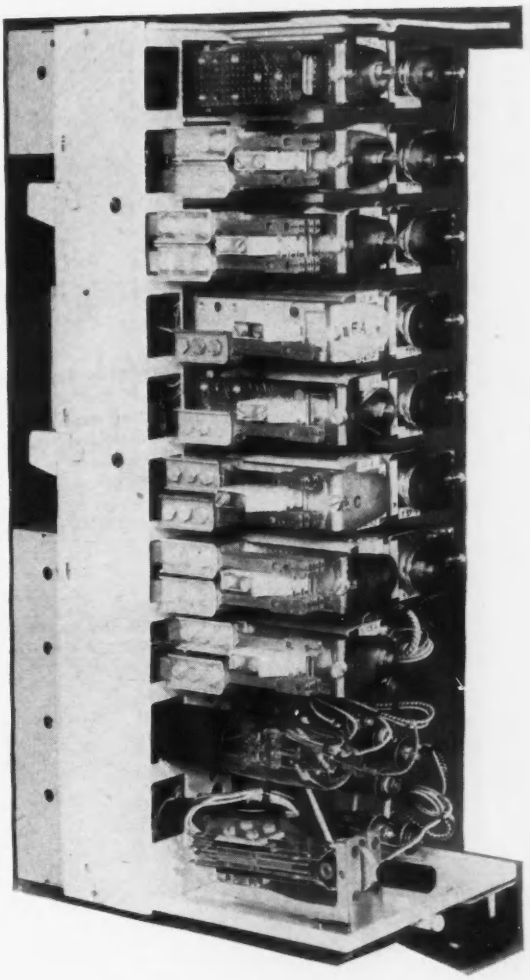
Mounting

Suitable for 19″ relay rack mounting or 4′6″ racks

Delivery

Few weeks from order.

Also available are relay sets for "E and M to loop," "E and M to simplex," "E and M to ringdown," etc.



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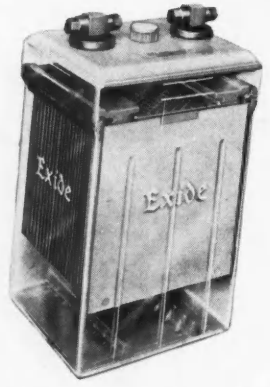

Big Capacity in Small Size. Unique positive plate in Exide-Tytex Battery has large area of active material that results in high capacity. Exclusive patented Silvium grid resists corrosion — prolongs battery life. Taperless plastic jars save one-third space. Exide Industrial Division, THE ELECTRIC STORAGE BATTERY COMPANY.

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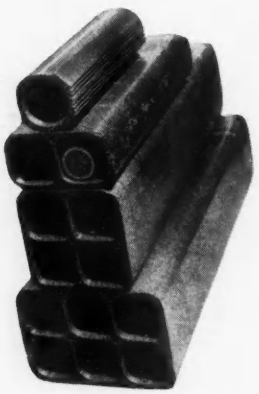

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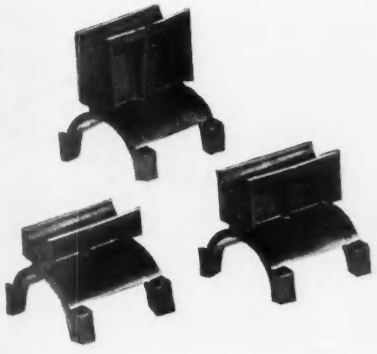

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PHELPS DODGE THERMOPLASTIC EXCHANGE AREA TELEPHONE CABLE

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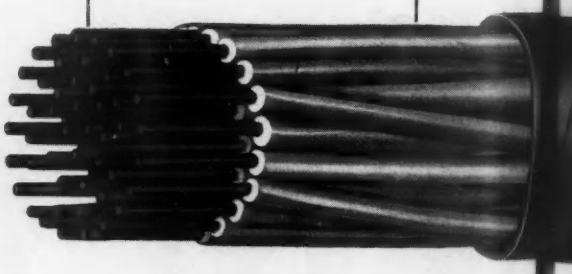

Exchange Area Telephone Cable, Aerial and Duct Type
(Supplied with protective aluminum armor and outer polyethylene jacket when intended for direct burial)

The controlled craftsmanship and quality of Exchange Area telephone cable are typical of the entire line of Phelps Dodge thermoplastic telephone wires and cables including:

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"MINE-TO-MARKET" LINE...

- Soft annealed copper conductors of highest grade copper from Phelps Dodge's own open pit mines.
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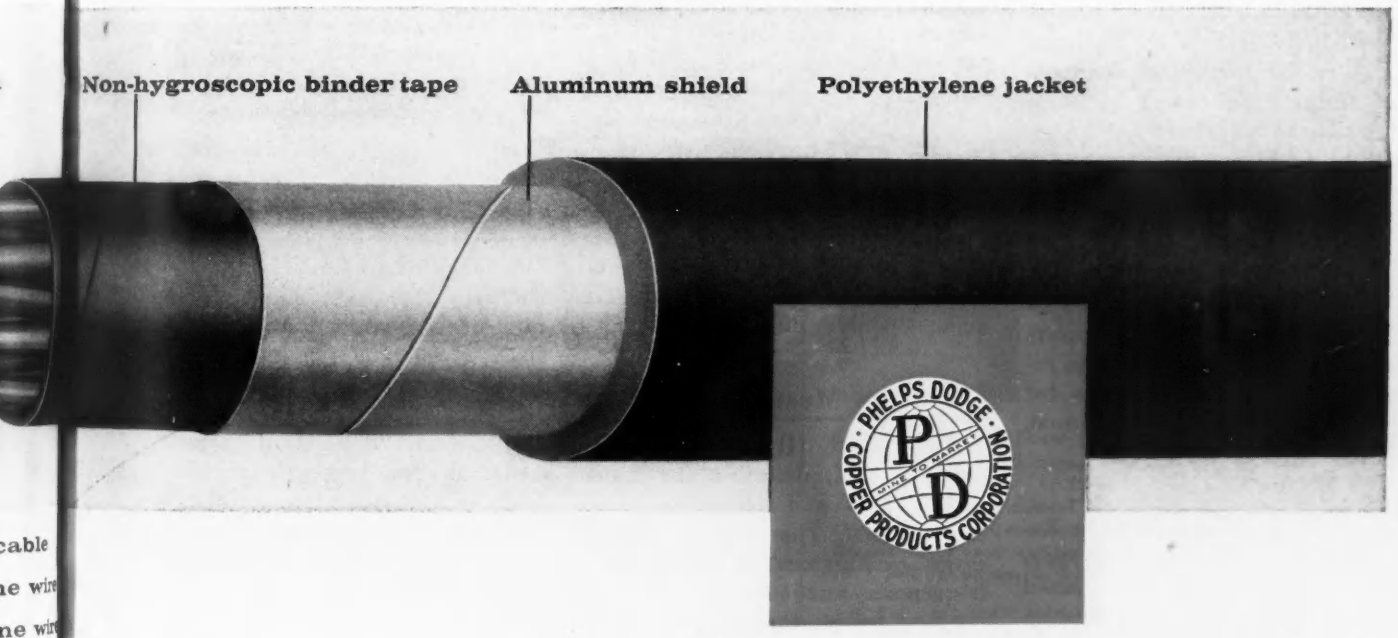

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FREE LITERATURE

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Soldering

ENGINEERING Bulletin No. 1 from Wassco Electric Products Corp., describes and illustrates principals of resistance soldering. This is the first of a new series of engineering bulletins. Your request for Bulletin No. 1 will bring you the complete series.

Carrier Equipment

BROCHURE from T. S. Skillman & Co., Pty. Ltd., describes constructional features and some performance details of Skillman's new range of carrier telephone equipment.

New brochure describes comprehensive range of in-built signalling facilities available and the practical approach which has been made in the mechanical design to provide installation and maintenance engineers with equipment that is small yet robust and particularly accessible for maintenance working, when required.

Radio Frequency Duplexer

BROCHURE from Budelman Radio Corp., describes type 149 radio frequency duplexer which is a tuned cavity network designed to provide for coupling a transmitter and receiver operating in the 450 or 900 megacycle bands to the same antenna and transmission line without interaction and with negligible loss in efficiency.

Secode Selector

ENGINEERING MANUAL from Electrical Communications, Inc., describes the Secode type 49 Selector, an electro-mechanical switch, responsive to direct current pulses, designed to close its contacts only upon receipt of a specific sequence of pulses, rejecting all others.

Applications include telephone signaling and remote control systems where a telephone dial or an automatic code sender is used for transmitting commands. Or the selector may be utilized in control or computing systems to actuate signals or other apparatus upon receipt of a specific sequence of pulses. Several selectors may be connected to a common control circuit, each responding only to its individual codes.

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Frequency Measurements

DATA FILE III, from Beckman-Berkeley Div., describes the many ways EPUT® and frequency meters can be used. The 17-page booklet covers measurement of low to UHF frequencies, rotational velocity, flow, pressure, temperature and strain, telemetry, and setting up a secondary standard of frequency.

Drafting Shortcuts

BOOKLET from Frederick Post Co., shows 59 shortcuts to speed drafting and computation work. Clearly written and well illustrated, this booklet shows new approaches to old problems. The section on "Calculating Ideas" contains 10 tips including easy ways of "Remembering the Signs of Trig Functions," "Dividing a Circle Into Parts," and "Locating Decimal Points."

Crimping Tools

LITERATURE from Electrix Terminals & Connectors, Inc., illustrates and describes the uses and performances of two new multi-purpose crimping tools for crimping standard and insulated solderless terminals and connectors; stripping insulation from wires and cutting wires and insulation. Information for tool identification and wire gauge capacities are included.

Conversion Factors

A REFERENCE table for engineers and other executives in wall chart form has been published by Precision Equipment Co. This Conversion Chart is useful for engineers, shop men and other executives.

Included are common conversions such as inches to centimeters or watts to H.P. as well as many conversions that are difficult to locate in reference manuals. (Some such examples are atmospheres to Kgs/sq. cm, cm/sec to miles/hr, cu. ft. to liters, microns to meters, quintal to lbs., etc., etc.)

Electric Chain Hoist

A COMPREHENSIVE and information-packed bulletin, describing the manufacturer's new Electric Chain Hoist which is available in two types of reeving: the single chain 300-2000 lb. capacity model and the double chain 3000-4000 lb. capacity model, has been prepared and issued by the Wright Hoist Division, American Chain & Cable Company, Inc.

Designated as Bulletin DH-73, this 4-page folder presents valuable data on construction details, weights, capacities, lifting speeds and dimensions.

Electric Generating Plants

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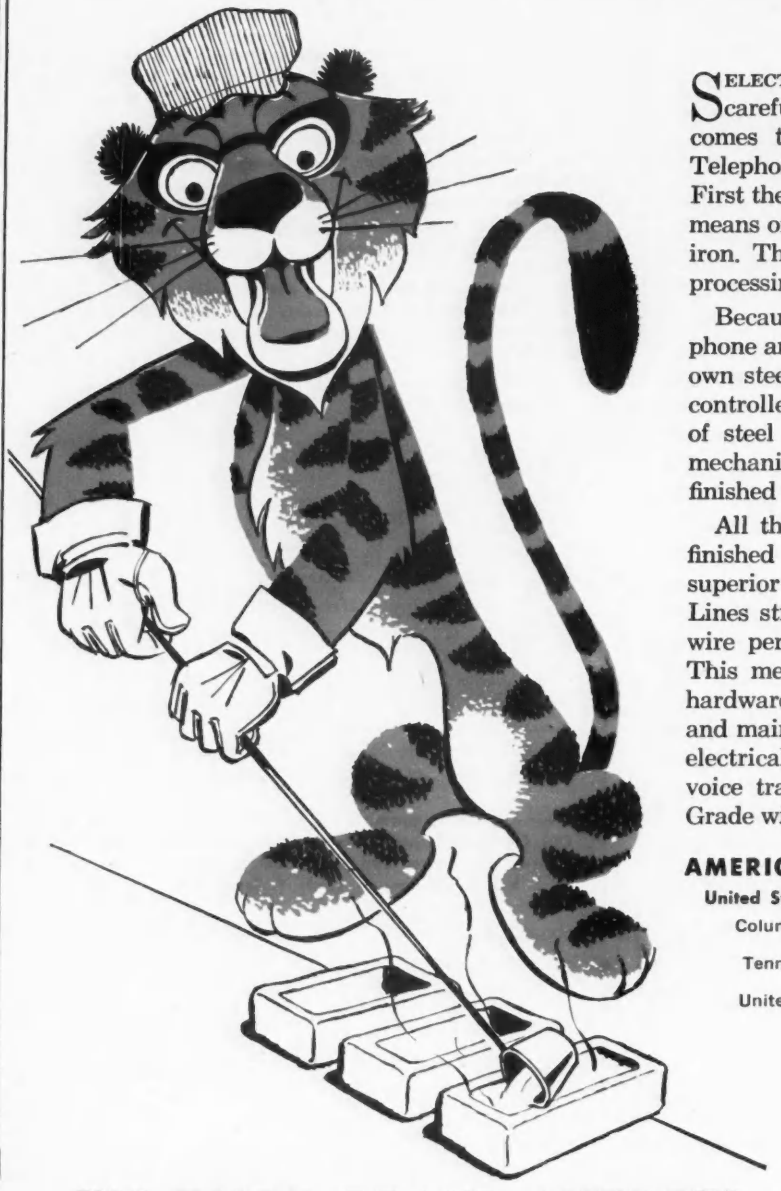

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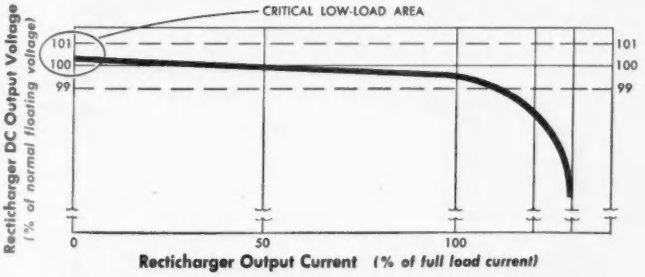

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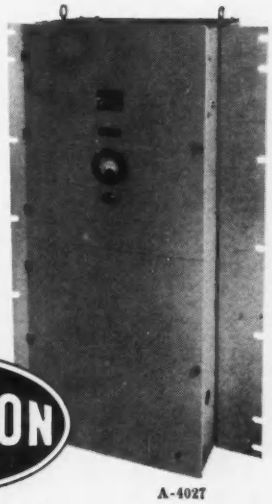

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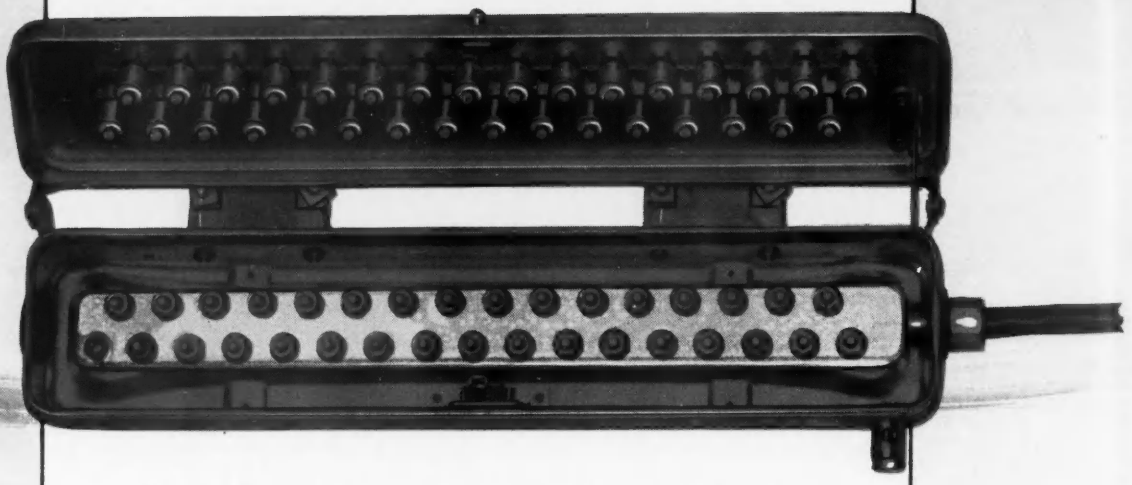

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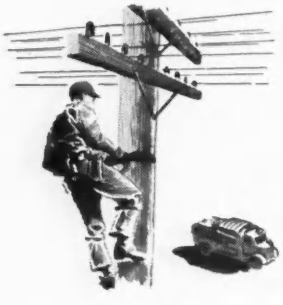

Dunn: Yes, it's been subjected to a continuous float life test typical of the kind of use it would get in most applications. And you can see for yourself just how little sediment there is on the bottom of the jar.

Reporter: What does that indicate?

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EDITORIAL

"Where's The Money Coming From?"

MORE AND MORE as we go about our business of reporting the "what's" and "why's" of events occurring in the telephone industry and interpreting outside-the-industry events that may effect the telephone industry, we are convinced that a major problem facing all American business and industry these days is the source of the capital funds that will be needed in the next few years to pay for expansion and modernization of facilities required to meet the needs of this country with its rapidly increasing population.

Right now there is an abundance of evidence which indicates that this problem has moved in and made a home for itself in the telephone industry. Just a brief glimpse of the telephone industry's building program for 1957 is enough to prove the industry has mapped out a big and costly job for itself.

Yet this 1957 program is just a very small fraction of what the industry must do in the next 10 years to expand and modernize to meet the needs of its customers.

We'll grant the job must be done. But around the country, we well know that telephone men are saying: *"It's a big job. It's going to cost a lot of money. Where's the money to come from?"*

That question is a good one and a very serious one. It has some telephone people working overtime these days.

In most businesses — manufacturing, for instance — the greater part of the money for the expansion and improvement of plant is generated within the business. But a telephone company, as utility regulators view it, must secure from investors the major cost of the kind of building program needed to meet the demands for its service.

Therefore, today's major problem actually simmers itself down to the fact that whether or not the nation's telephone companies can give the communities they serve the kind of telephone equipment and service they demand, depends on how willing people are to invest their savings in the telephone business.

In the utility field where regulation has been substituted for competition, some regulatory commissions have tended to consider that small profits are in the public interest. However, the fact remains that where regulation has permitted higher earnings, these earnings have encouraged expansion and improvement that have in turn benefited the public.

Planning ahead and building ahead to anticipate needs is just basic, good business practice. It means more service, new services and service at lower cost than the industry could otherwise offer.

If the telephone industry is to hew to this line — if its customers are to get the best service at the lowest cost over the long pull — *then each telephone company must earn enough to justify broad planning for the future and the long-term risks that new and revolutionary service improvement require.*

The records prove that with sufficient earnings, a telephone company can choose the type of construction program that promises the best return over the years ahead. Taking the long view may mean greater initial cost and longer term risks. But the alternative is a program that costs less at the outset but more later on with poor long-range results.

In our opinion what has been said thus far adds up this way: (1) In order to build for the future, a telephone company must be able, on a more competitive footing, to attract the investment dollars of the American people, and to attract those dollars, the company must be permitted a larger earning potential.

To add up all parts of the problem and obtain that answer is comparatively easy. No crystal ball is needed. Neither is it necessary to resort to a sleight-of-hand trick.

Producing that answer requires only an understanding of the fact that the people of America, by increasing millions, are investing in America, and many are investing in the telephone business, but earnings adequate to attract more capital investment to telephone companies are necessary and vital if the companies are to keep pace with the service demands of today and the future.

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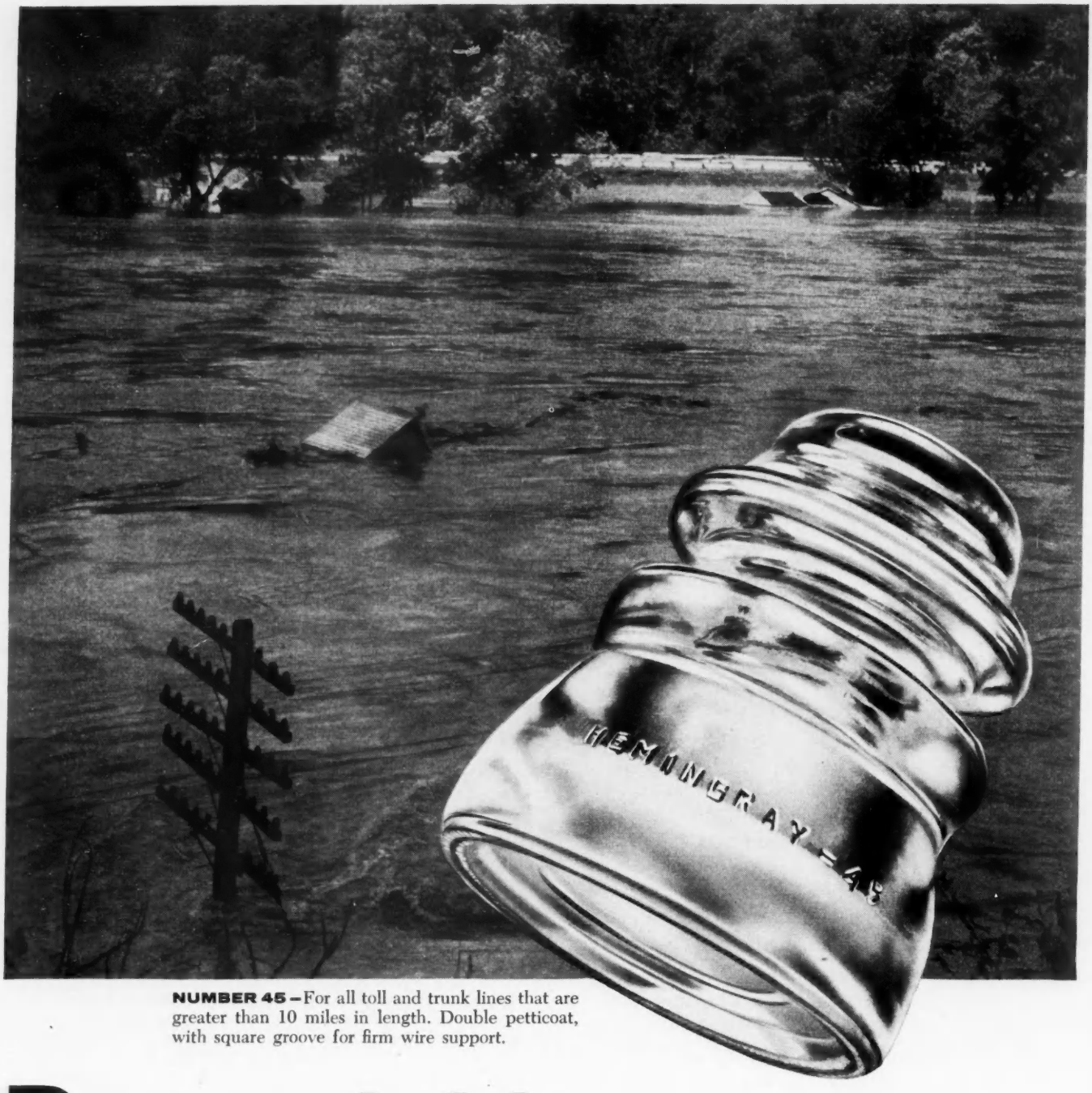

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EARTH BORING EQUIPMENT SAVES TIME AND MONEY

By RICHARD ALLEN

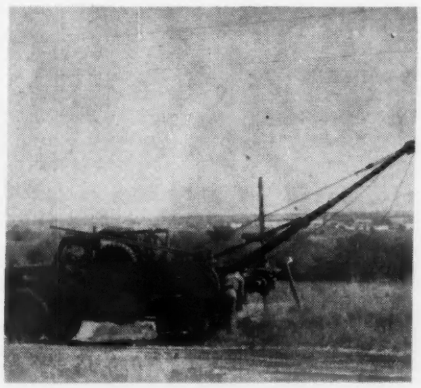

FIG. ONE: — Typical use of earth borer in pole line erection to serve new housing area. Top — Starting the pole hole. Center — Digging about done. Bottom — Setting the pole with derrick mounted on same vehicle with earth borer. This sequence of action took place almost as rapidly as the pictures could be taken.

Not much can be done about the cost of materials but it is possible to control labor costs by the use of power-driven tools in conjunction with motor vehicles.

WITH CONSTANTLY rising costs of expanding plant construction, it has become more necessary than ever to employ labor saving machinery. In telephone organizations, pole line construction is an important item of expense where outside plant is concerned. Here nothing much can be done about the cost of materials such as poles, crossarms, line hardware, insulators, and wire or cable, but it is possible to control labor costs by the use of power driven tools in conjunction with motor vehicles.

It is obvious that motor equipment provides the greatest saving from the standpoint of transportation and providing power for the operation of tools. Years ago, toll line building projects were usually camp jobs because the only available transportation was by horse and wagon from the nearest town. Using a good team under average traveling conditions, the best time that could be made was four miles an hour. With the advent of motorized transportation, all this was changed, and today crews can be transported direct from distant headquarters in far less time than from old-time camp locations.

Back in the old days when the telephone industry was still in its infancy, it was common for construction crews to be composed of ten to fifteen men. Such a large number of men were needed to handle the muscular work of digging pole holes with hand tools and piking poles into the holes.

The introduction of motor vehicles was soon followed by the development of winches operated by a power take-off from the truck transmission.

FIG. TWO: — Earth borer of fixed bed type for heavy duty service.

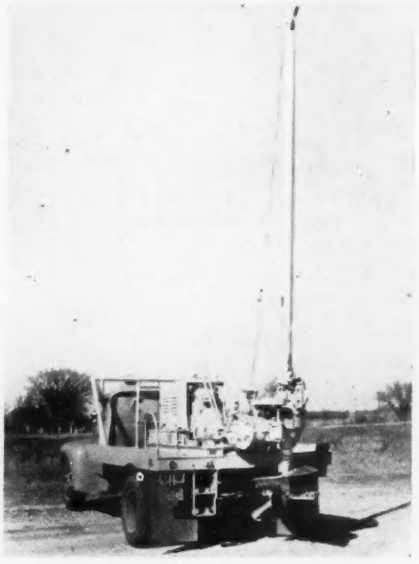

FIG. THREE: — Platform, or skid mounted type of earth borer designed to accurately locate or "spot" the auger for precise boring operations.

FIG. FOUR: — Hydraulic controlled earth boring machine with hydraulic turntable and "fore and aft" mounting, which allows the digger to be swung in an 180° arc.

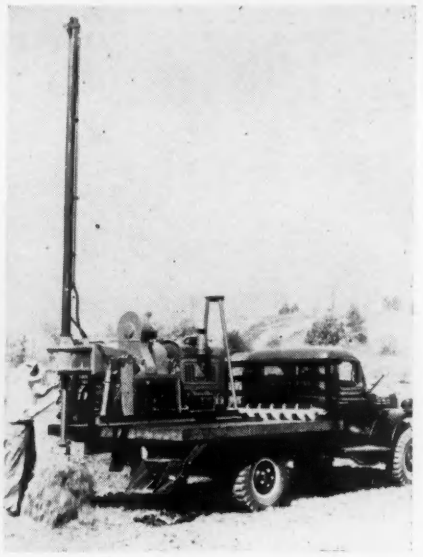

FIG. FIVE: — This skid mounted earth borer has sensitive hydraulic controls for close control of digger.

When used with a truck mounted pole derrick, the winch could raise the poles into the pole holes, eliminating the slow and dangerous piking work. Concurrently with this development came the mechanized earth borer that could also be operated from the truck transmission.

The early models of earth boring equipment were very expensive to purchase and required considerable maintenance to keep them in operating condition. Only the larger companies could afford them. Nevertheless, they saved considerable labor and soon paid for themselves. They could set down a six feet deep hole in a few minutes, whereas the best that a good worker could do to dig the same depth hole with hand tools was one and one-half hours, a rate of five holes per working day.

FIG. SIX: — This new utility vehicle is stated to be the first rubber-tired chassis of its kind designed as a digger carrier for installation of new and replacement poles as well as for new line construction. It is equipped with a rear-mounted digger and winch.

Improvements in the design of the equipment and increased production have reduced investment costs of these machines to some extent. Moreover, simpler models have also been developed which work well in most soils. The modern earth boring machines now enable telephone organizations to reduce the former large crews to small units and thus more effectively control labor costs.

This article is devoted to a discussion of various types of earth borers and pole hole diggers, also varieties of augers designed for different soils.

Earth boring equipment may be placed in two general classes, the first including earth borers mounted or carried on the truck bed, and second, portable or suspended type pole hole diggers. Those in the truck chassis mounting classification are of the fixed bed mounting, movable platform, and turntable types, and also includes earth boring units mounted on crawler tractors or carrier units. The portable digger classification includes mechanical or hydraulic gear head diggers designed to be suspended from derrick booms or winch lines and suspended self-contained engine driven diggers that are supported from derrick winch lines.

Most of the foregoing machines are employed in conjunction with a pole derrick on the same vehicle to avoid the necessity for having two trucks on the same job. *Figure* 1 illustrates a typical use of this arrangement. Many telephone companies consider this to be a very de-

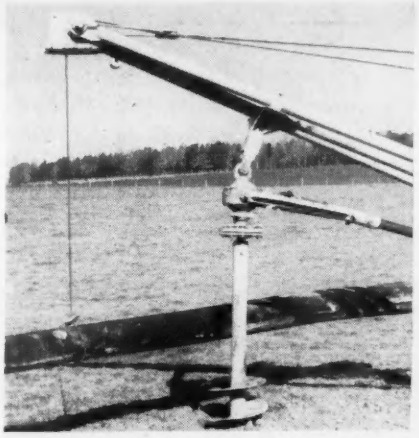

FIG. SEVEN: — Portable type mechanical digger with clamping bracket attached to derrick boom. Note use of pole on winch line to weight down digger for boring pole hole in frozen or hardpan soil.

FIG. 10: — This illustrates how the hydraulic digger with guide and torque frame can be brought into position for digging by simple hydraulic controls. For front derrick mounting, the hydraulic controls are located on one of the front supports of the derrick mounting.

FIG. EIGHT: — Hydraulic digger with rigid bracket type power feed. Auger shown has a cutter head designed to prevent weeds and stones from jamming the blades.

sirable feature, since practically all their holes are bored for setting poles. The derrick itself may be an integral part of the earth borer or separately mounted on the truck.

Earth Boring Equipment For Truck Chassis Mounting

MODERN EARTH borers have evolved to more or less extent from the first type which was operated from the truck engine through a train of gears and shafting. The latest of the fixed bed type is illustrated in *Figure* 2.

The unit illustrated consists of a double train of gears, controlled by two multiple disc clutches and brakes. The drive gears rotate the auger by power, and the feed gears transmit the power to force the auger into the ground while rotating and to raise the auger out of the ground. This unit is capable of digging as large as a 30″ diameter hole up to 10 feet deep in clay, hardpan, shale, or frozen ground.

The boring case and the intermediate case are equipped with leveling mechanisms that permit quick adjustment to dig holes straight

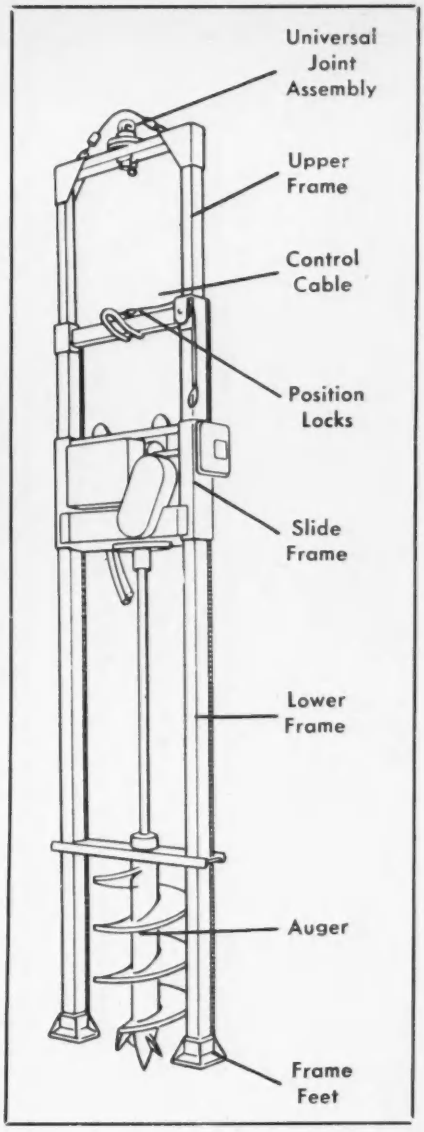

FIG. 11: — Showing the component parts of the hydraulic digger guide and torque frame

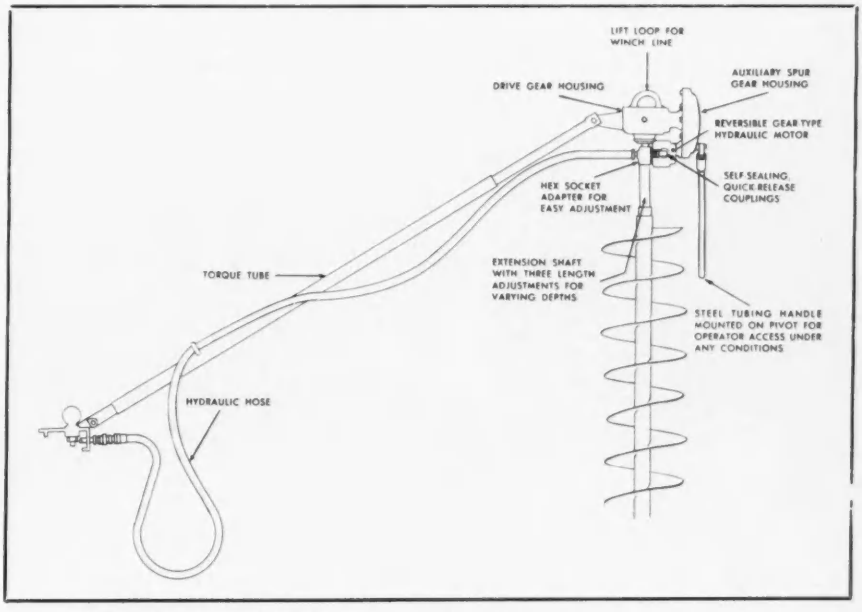
LIFT LOOP FOR WINCH LINE
DRIVE GEAR HOUSING
AUXILIARY SPUR GEAR HOUSING
REVERSIBLE GEAR TYPE HYDRAULIC MOTOR
SELF SEALING, QUICK-RELEASE COUPLINGS
HEX SOCKET ADAPTER FOR EASY ADJUSTMENT
EXTENSION SHAFT WITH THREE LENGTH ADJUSTMENTS FOR VARYING DEPTHS
TORQUE TUBE
STEEL TUBING HANDLE MOUNTED ON PIVOT FOR OPERATOR ACCESS UNDER ANY CONDITIONS
HYDRAULIC HOSE

FIG. NINE: — Showing construction of hydraulic earth digger.

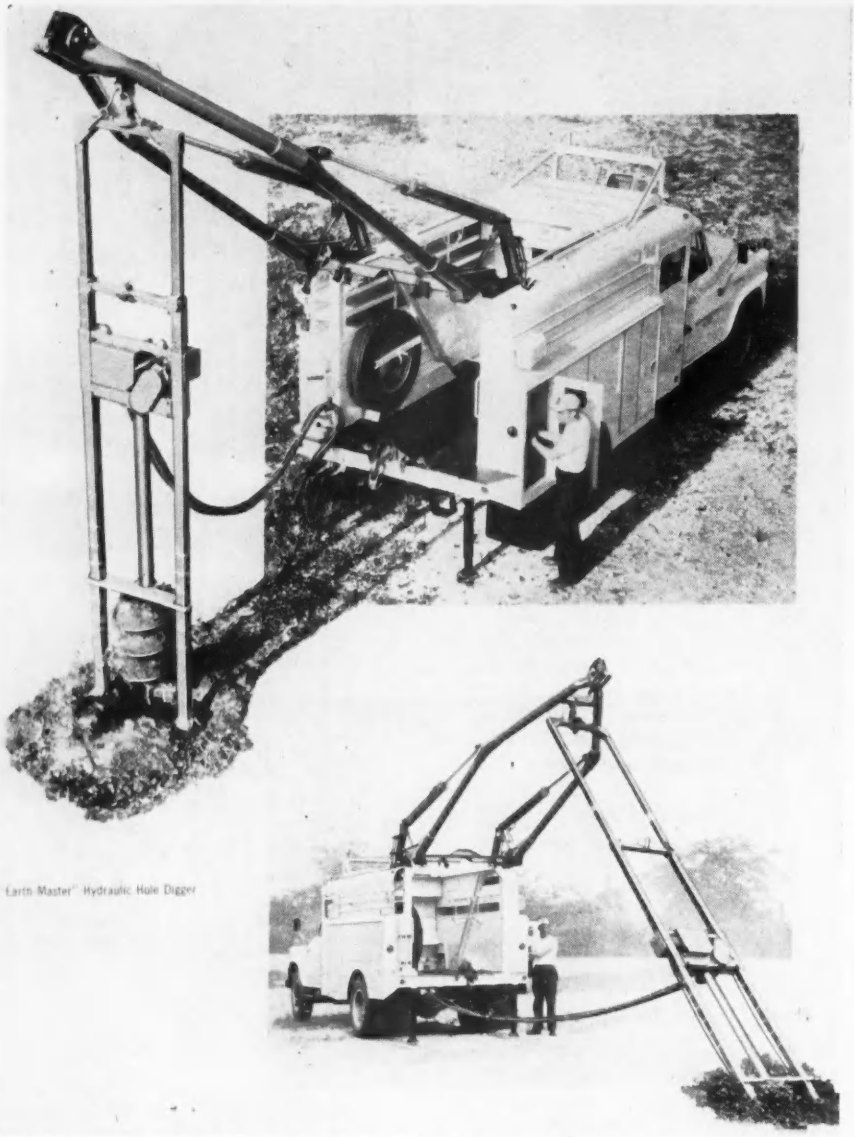

FIG. 12: — Hydraulic digger with guide and torque frame in a typical pole hole digging operation.

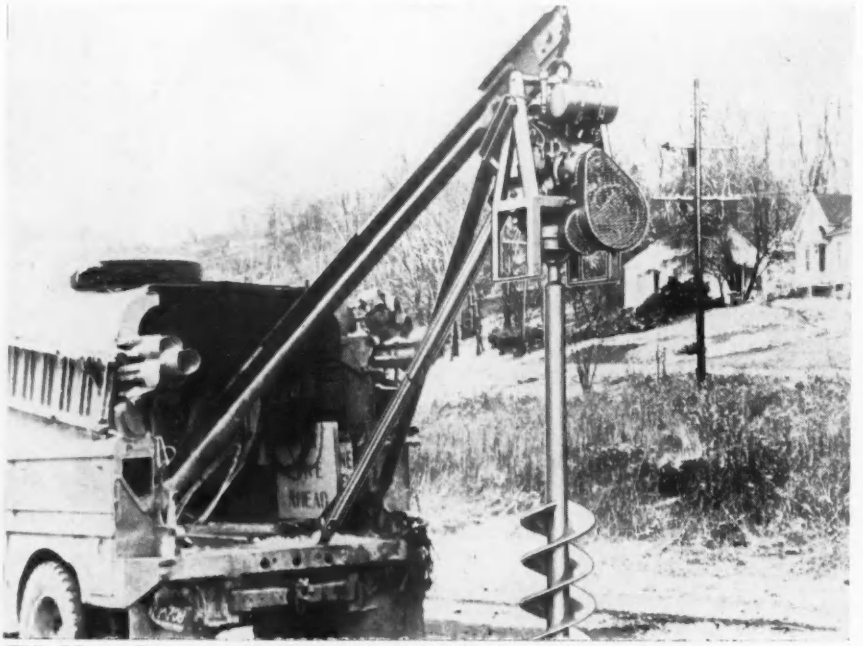

FIG. 13: — Digger with self-contained 8.2 H.P. gasoline engine suspended from winch line on truck derrick. Note torque bar extending to truck bed for retaining digger in position during the digging operation.

down, at 60° to the rear, or 20° toward the front. Power is applied to the leveling mechanism that raises the auger bar from traveling or horizontal position to working or vertical position.

Control levers on the truck unit are arranged to permit the operator to stand on the truck bed where he has access to the power leveling device and at the same time has a clear view of the auger. The digging controls are in neutral position until pressure is applied on either lever or both. The operator may bring the digging operation to a complete stop by merely releasing the levers, providing safety for both the operator and the machine.

A 3500 pound capacity winch and telescoping pole derrick to handle 40- to 50-foot poles are furnished as optional equipment on the earth borer illustrated. Both the winch and the derrick are mounted as integral parts of the boring unit, the winch obtaining its power from the clutch gears, eliminating the necessity for a separate drive from the truck engine. Power is furnished to the earth boring unit from the truck engine.

The earth boring unit with derrick and winch discussed in the foregoing is also available for mounting on a crawler tractor. In this case, the controls are accessible from the side and the operator stands on the ground to operate them.

Figure 3 illustrates a platform (skid) mounted type of earth borer. It can be brought in position to accurately locate or "spot" the auger for precise boring. It is designed to eliminate the necessity for maneuvering the truck into position for the digging or pole-setting operation. With this machine the operator can "reach" over the digging obstructions such as large rocks and can shift digging direction should an underground obstacle be encountered.

Finger-tip controlled hydraulic positioning allows the operator to position the boring machine within an arc of 80 inches and extend the unit 22-inches from the platform. The boring machine will dig at any point within this arc and within the forward and aft traverse. A hydraulic positioning ram controls auger travel across the rear of the truck body.

The skid-mounted earth-boring machine is designed to dig holes nine to thirty-six inches in diameter and

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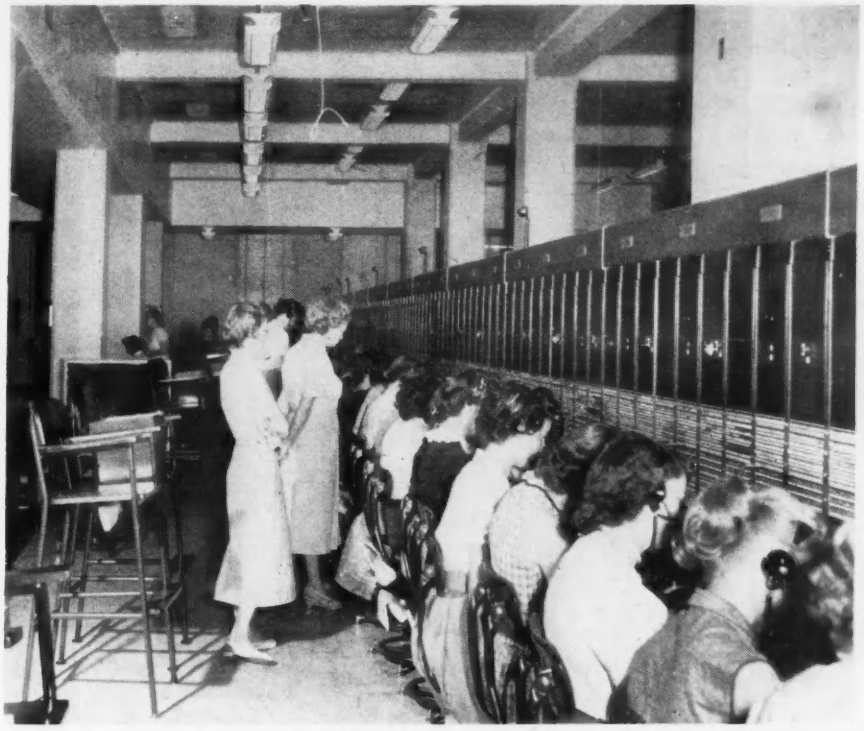


Large operating rooms such as shown above were previously serviced by huge window and floor fans. Today small outlets from ceiling ducts distribute conditioned air year-round. Employe morale and efficiency is considerably higher.

Year-Round Air Conditioning at Atlanta

By ANDREAS A. PATJENS*

Since 1955 Southern Bell's central station air conditioning system has been proving its value. Dial circuit troubles have been greatly reduced; employe morale and efficiency have been raised; and building maintenance cost materially reduced.

THE MAGNITUDE and complexity of telephone communications in the mid 20th century all but staggers the imagination. One telephone call may require operation of hundreds of electrical contacts. Multiply this by thousands of local and long distance calls and some realization can be had of the daily operation of Southern Bell Telephone & Telegraph Co., Atlanta, Ga.

With the expansion of telephone facilities has come the introduction of extensive systems of intricate and delicate relays and switches which are in constant operation. The performance of these systems, similar to electronic computers or data-processing installations, may be affected to some extent by high humidity and dust. To control these conditions and to improve working conditions in the area, year-round air conditioning provides cooling and dehumidification during hot weather and heating and humidification during cold weather, filtering and circulating throughout the year.

Until 1947, ventilation of the Southern Bell Toll building in Atlanta, consisted of window and floor fans. When eight floors were added to the building's original six stories, ventilation ducts were included to meet existing needs.

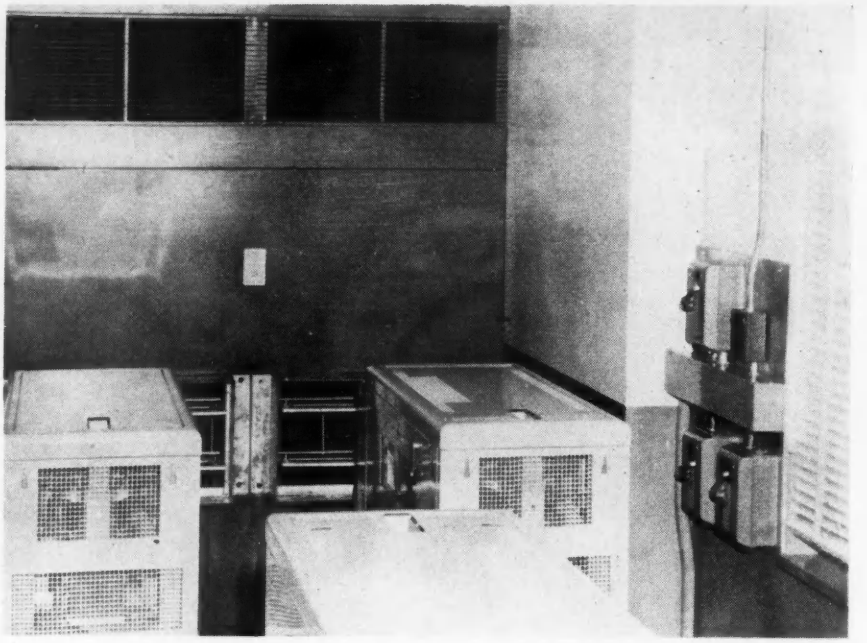
In 1950, when long distance dialing equipment was installed in the building, dehumidification was introduced as a safe guard for the equipment as well as to improve working conditions.

In 1955 — Southern Bell decided to install a complete central station air conditioning system using chilled water provided by two Hermetic Centrifugal Refrigeration machines (300 tons capacity each), manufactured by Carrier Corp.

Continued on next page

**Building Engineer, Southern Bell Telephone & Telegraph Co.*

The compact, orderly-looking machines operate with negligible vibration or noise. They are without heavy concrete bases, and occupy little space. Although of the hermetic or enclosed motor construction, whereby air and water vapor and refrigerant leakakes are prevented, they are nevertheless arranged for easy service through convenient access covers.

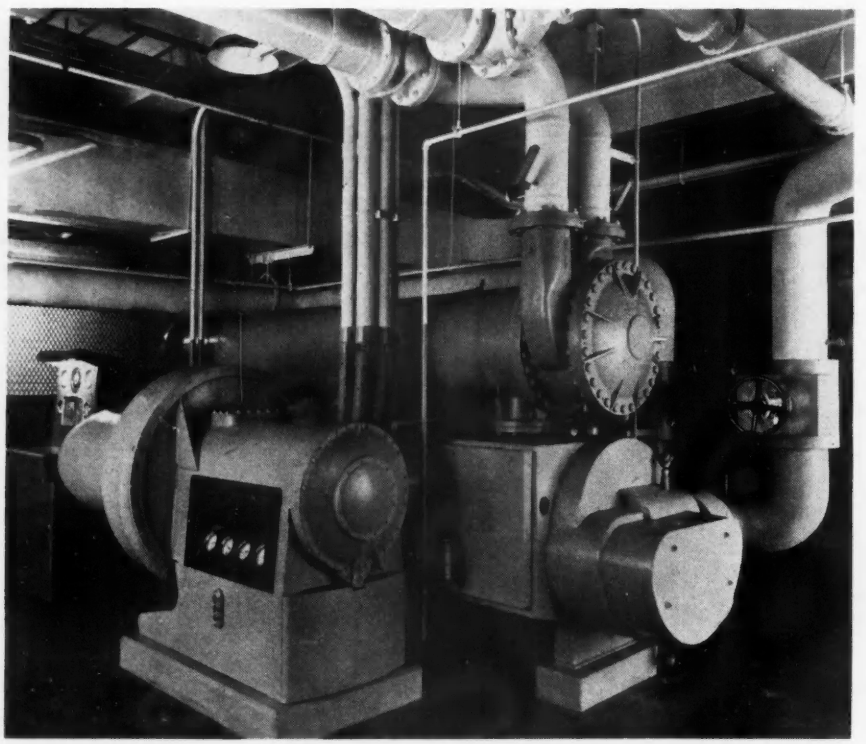


Electronic toll translator equipment selects long distance phone routes by means of a photo electric cell. Units can release as high as 1000 watts of heat per hour, per machine. Equipment is highly sensitive to changes in temperature and humidity. (Note air condition unit in background.)

Heat Transfer System

LOCATED in the sub-basement the machines operate on the principle of "heat transfer." Water in the tubes of the machine's cooler shell, (prior to circulation to conditioning equipment), is chilled by transferring its heat to cold liquid refrigerant. By absorbing heat from the water, the refrigerant vaporizes and is drawn into the suction side of a 2-stage centrifugal compressor. The compressed gas is then discharged into the condenser shell under pressure and at a higher temperature than water in the condensing tubes. Here the heat originally gathered up by the air conditioning equipment is transferred to the condensed water. The refrigerant reverts to a liquid state again. It drains by gravity to the cooler below and the cycle continues. (See diagram)

With a combined cooling capacity of 600 tons the two refrigeration machines have the ability to adjust automatically to cooling loads varying from 10 per cent to 100 per cent of capacity.



Two Carrier hermetic centrifugal refrigeration machines (like one shown above), 300 tons capacity each, provide chilled water for each of 14 air handling units stationed on every floor. Machines located in basement operate with negligible noise — can adjust automatically to cooling loads varying from 10% to 100% capacity.

Electronic controls insure a matching of the machines' capacity to the momentary load. This fact is of importance to the operation of a telephone equipment building. Some switching rooms are in operation 24 hours a day — in contrast with the business office areas, functioning 8-9 hours per day, five days a week. As can readily be seen, heat loads and corresponding cooling requirements of the entire building are of necessity in a constant state of change.

As an example: Portions of the building contain equipment for long distance transmission between cities. With the use of thousands of vacuum tubes, congested in several hundred square feet of space — heat up to 60 watts per square foot is encountered in some areas.

When the building's cooling requirements decrease — the refrigeration machines automatically throttle down. If the refrigeration load drops to a certain point one machine shuts off. When the number of telephone calls increases, with a corresponding increase in telephone switching equipment activity, the second machine starts automatically producing cooling — in accordance with demand.

The water chilled by the refrigeration machines is pumped at the rate

Please turn to page 80

RURAL DISTRIBUTION WIRE

By JOHN S. REED

Part III: — Electrical Protection Requirements and Methods of Terminating and Splicing.

Protective Requirements for Rural Distribution Wire

RURAL distribution wire is exposed to the same hazards of lightning and power contacts as open wire and requires corresponding protective measures. At the same time, the support wire requires effective grounding as additional protection for the circuits carried in the distribution wire. This manual outlines suggested protective and grounding procedures applicable to 6-pair distribution wire.

Figures 31 *and* 32 illustrate typical locations of grounding points in rural distribution wire leads in joint and non-joint construction. The support wire should be grounded at approximate intervals of ¼ mile, in no case over ½ mile.

Ground may be obtained by connecting to the same ground lead as a high-voltage type protector or 6-pair protector, or by bonding to messenger strand of lead-covered cable (or equivalent metal sheathed cable) or to vertical grounding conductor from power multi-grounded neutral wire on jointly used pole.

If no ground connection is available within ½ mile of the nearest ground point, a ground rod should be installed and ground wire run to the connection with the support wire. The method of grounding the support wire in this manner is shown in *Figure* 33.

When the distribution wire is run on the same poles with lead-covered cable, the support wire is bonded to the messenger at the ends of the distribution wire run and at about ¼ mile intervals.

In non-joint or standard joint construction (power voltages less than 2900 volts to ground or neutral) where the distribution wire connects to lead-covered cable and the length of the distribution wire exceeds ½ mile or lightning exposure is severe on shorter runs, a 6-pair protector should be placed at the junction with lead-covered cable as indicated in *Figure* 31. Whether or not protection is needed, the support wire should be bonded to the messenger strand, and if a 6-pair protector is required, a ground rod should be installed for the protector and the support wire and messenger bonded to the protector ground post.

The requirements for protection at junctions of lead-covered cable with rural distribution wire is sometimes questioned by plant men. The reason given for this requirement is that conductors of the distribution wire have a high dielectric strength insulation so that a relatively high-voltage charge may pass through the distribution wire without damaging it, but, on going into the lead-covered cable, may break down to ground through the paper insulation of the cable conductors. The 6-pair protector at the junction between the lead-covered cable and the rural distribution wire is intended to prevent the breakdown of the paper insulated cable conductors by voltages not affecting the insulation of the distribution wire conductors.

At junctions of distribution wire with open wire and any or all open-wire pairs exceeding ½ mile in length, a 6-pair protector should be placed at the junction with the open wire. In this case, a ground rod should be installed for the protector and the support wire bonded to the protector ground post.

At intermediate points in the dis-

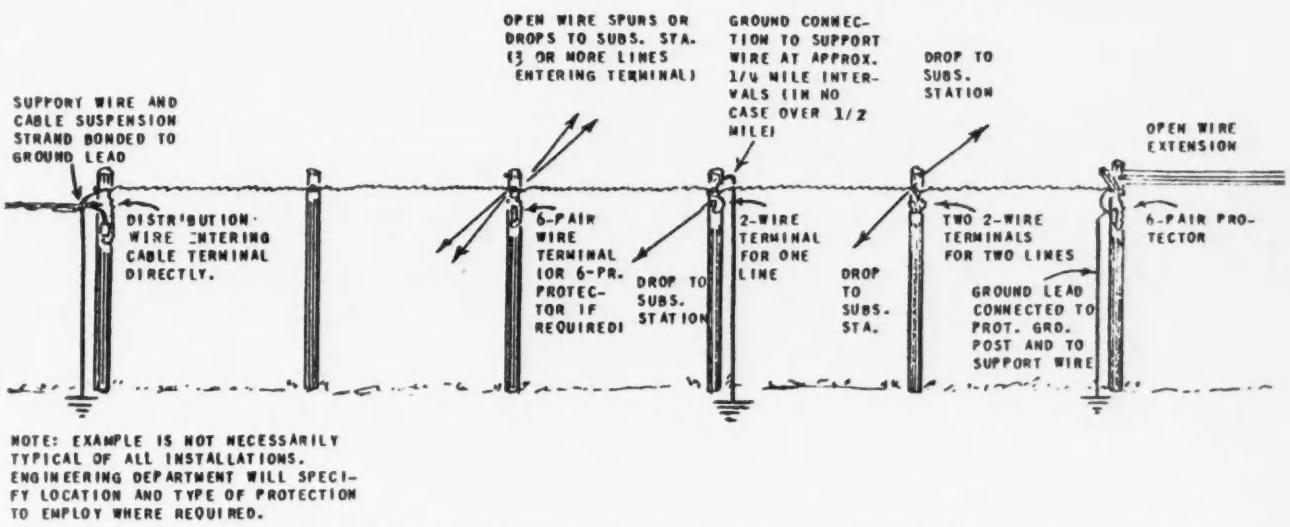

SUPPORT WIRE AND CABLE SUSPENSION STRAND BONDED TO GROUND LEAD
DISTRIBUTION WIRE ENTERING CABLE TERMINAL DIRECTLY.
OPEN WIRE SPURS OR DROPS TO SUBS. STA. (3 OR MORE LINES ENTERING TERMINAL)
6-PAIR WIRE TERMINAL (OR 6-PR. PROTECTOR IF REQUIRED)
DROP TO SUBS. STATION
GROUND CONNECTION TO SUPPORT WIRE AT APPROX. 1/4 MILE INTERVALS (IN NO CASE OVER 1/2 MILE)
2-WIRE TERMINAL FOR ONE LINE
DROP TO SUBS. STA.
DROP TO SUBS. STATION
TWO 2-WIRE TERMINALS FOR TWO LINES
GROUND LEAD CONNECTED TO PROT. GRD. POST AND TO SUPPORT WIRE
OPEN WIRE EXTENSION
6-PAIR PROTECTOR
NOTE: EXAMPLE IS NOT NECESSARILY TYPICAL OF ALL INSTALLATIONS. ENGINEERING DEPARTMENT WILL SPECIFY LOCATION AND TYPE OF PROTECTION TO EMPLOY WHERE REQUIRED.

FIG. 31:—Rural distribution wire installation in non-joint or standard joint construction with voltages *not* exceeding 2900 volts to ground.

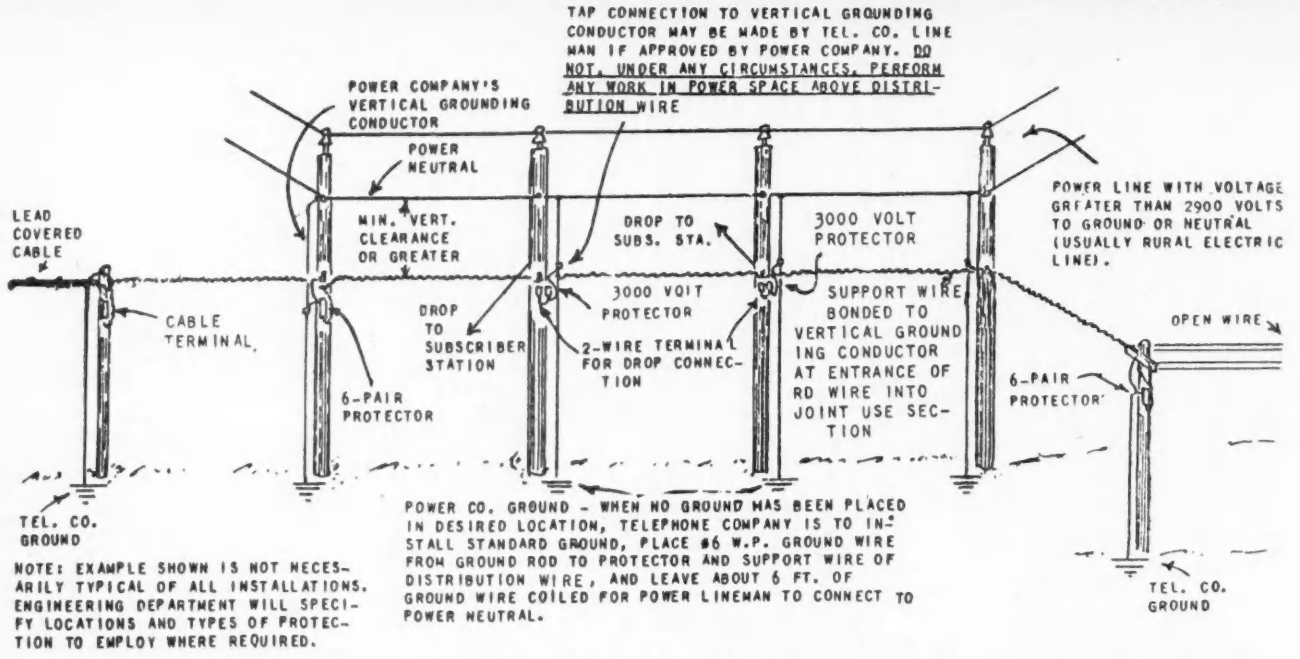

TAP CONNECTION TO VERTICAL GROUNDING CONDUCTOR MAY BE MADE BY TEL. CO. LINE MAN IF APPROVED BY POWER COMPANY. DO NOT, UNDER ANY CIRCUMSTANCES, PERFORM ANY WORK IN POWER SPACE ABOVE DISTRIBUTION WIRE
POWER COMPANY'S VERTICAL GROUNDING CONDUCTOR
POWER NEUTRAL
LEAD COVERED CABLE
MIN. VERT. CLEARANCE OR GREATER
DROP TO SUBS. STA.
3000 VOLT PROTECTOR
POWER LINE WITH VOLTAGE GREATER THAN 2900 VOLTS TO GROUND OR NEUTRAL (USUALLY RURAL ELECTRIC LINE).
CABLE TERMINAL
DROP TO SUBSCRIBER STATION
3000 VOLT PROTECTOR
SUPPORT WIRE BONDED TO VERTICAL GROUNDING CONDUCTOR AT ENTRANCE OF RD WIRE INTO JOINT USE SECTION
OPEN WIRE
2-WIRE TERMINAL FOR DROP CONNECTION
6-PAIR PROTECTOR
6-PAIR PROTECTOR
TEL. CO. GROUND
POWER CO. GROUND - WHEN NO GROUND HAS BEEN PLACED IN DESIRED LOCATION, TELEPHONE COMPANY IS TO INSTALL STANDARD GROUND, PLACE #6 W.P. GROUND WIRE FROM GROUND ROD TO PROTECTOR AND SUPPORT WIRE OF DISTRIBUTION WIRE, AND LEAVE ABOUT 6 FT. OF GROUND WIRE COILED FOR POWER LINEMAN TO CONNECT TO POWER NEUTRAL.
TEL. CO. GROUND
NOTE: EXAMPLE SHOWN IS NOT NECESARILY TYPICAL OF ALL INSTALLATIONS. ENGINEERING DEPARTMENT WILL SPECIFY LOCATIONS AND TYPES OF PROTECTION TO EMPLOY WHERE REQUIRED.

FIG. 32: — Rural distribution wire installation in joint construction with voltages exceeding 2900 volts to ground.

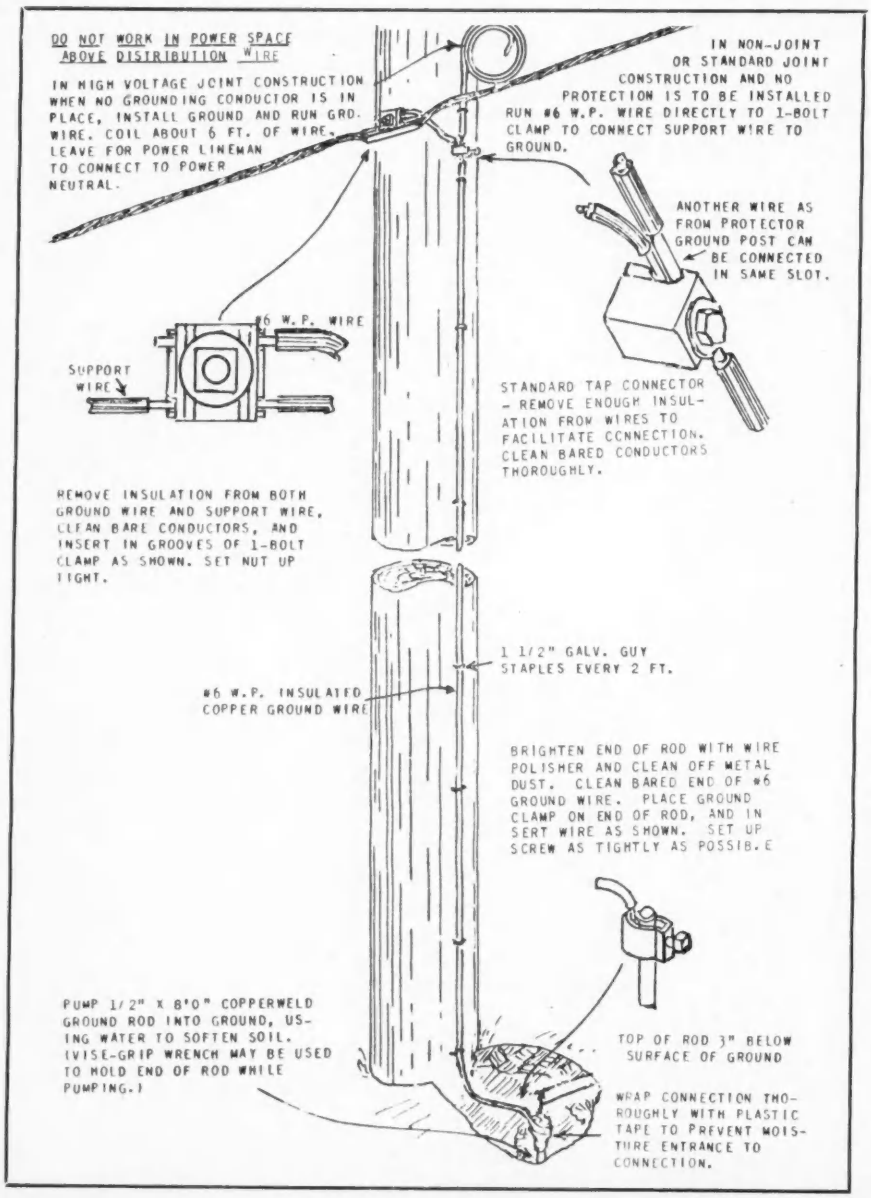

DO NOT WORK IN POWER SPACE ABOVE DISTRIBUTION WIRE
IN HIGH VOLTAGE JOINT CONSTRUCTION WHEN NO GROUNDING CONDUCTOR IS IN PLACE, INSTALL GROUND AND RUN GRD. WIRE. COIL ABOUT 6 FT. OF WIRE, LEAVE FOR POWER LINEMAN TO CONNECT TO POWER NEUTRAL.
IN NON-JOINT OR STANDARD JOINT CONSTRUCTION AND NO PROTECTION IS TO BE INSTALLED RUN #6 W.P. WIRE DIRECTLY TO 1-BOLT CLAMP TO CONNECT SUPPORT WIRE TO GROUND.
ANOTHER WIRE AS FROM PROTECTOR GROUND POST CAN BE CONNECTED IN SAME SLOT.
#6 W.P. WIRE
SUPPORT WIRE
STANDARD TAP CONNECTOR - REMOVE ENOUGH INSULATION FROM WIRES TO FACILITATE CONNECTION. CLEAN BARED CONDUCTORS THOROUGHLY.
REMOVE INSULATION FROM BOTH GROUND WIRE AND SUPPORT WIRE, CLEAN BARE CONDUCTORS, AND INSERT IN GROOVES OF 1-BOLT CLAMP AS SHOWN. SET NUT UP TIGHT.
1 1/2" GALV. GUY STAPLES EVERY 2 FT.
#6 W.P. INSULATED COPPER GROUND WIRE
BRIGHTEN END OF ROD WITH WIRE POLISHER AND CLEAN OFF METAL DUST. CLEAN BARED END OF #6 GROUND WIRE. PLACE GROUND CLAMP ON END OF ROD, AND INSERT WIRE AS SHOWN. SET UP SCREW AS TIGHTLY AS POSSIBLE
PUMP 1/2" X 8'0" COPPERWELD GROUND ROD INTO GROUND, USING WATER TO SOFTEN SOIL. (VISE-GRIP WRENCH MAY BE USED TO HOLD END OF ROD WHILE PUMPING.)
TOP OF ROD 3" BELOW SURFACE OF GROUND
WRAP CONNECTION THOROUGHLY WITH PLASTIC TAPE TO PREVENT MOISTURE ENTRANCE TO CONNECTION.

FIG. 33 (Left): — Method of connecting support wire or rural distribution wire to buried ground wire.

tribution wire lead where connections are made for more than two drops or open-wire spurs, a 6-pair wire terminal should be installed. Where only one or two drops, ultimate, are connected to an intermediate point, two-wire terminals are generally employed. In the unusual situation where the subscriber's station is subject to frequent lightning trouble, a standard outside protector less fuses and equipped with 6-mil blocks may be substituted for the 2-wire terminal to provide additional protection. The protector ground post is connected to the support wire. A ground rod need not be placed unless required as a ground point for the support wire.

In high voltage joint construction (power voltages exceeding 2900 volts to ground or neutral — *Figure* 32) where the distribution wire is not shielded by overhead open wires or lead-covered cable, a 6-pair protector is required at or near each end of the lead, also at intermediate points where connections are made for more than two drops or open wire spurs. For only one or two drops, ultimate, connected at an intermediate point, 2-wire terminals with high-voltage type protectors are installed (*Figure* 49). When distribution wire is placed between two points and there are no subscribers' drops from the RD wire

between these points, no additional protection is required.

When the telephone organization installs a vertical grounding conductor to the power line neutral, it should notify the power company, so that the connection to the power line neutral will be made by a power lineman as soon as possible. It is obvious that a telephone company employe should not be allowed to make this connection.

Terminating Rural Distribution Wire

RURAL distribution wire is terminated in one of several different ways, depending on whether a junction with open wire or cable is involved, or whether connection is to be made at an intermediate point. Standard 6-pair protectors or 6-pair wire terminals are employed, depending on whether or not protection is required at these points as outlined in the section on protective requirements.

Figures 34 *to* 36 illustrate methods of connecting rural distribution wire at junctions with cable and open wire and at intermediate points in a 6-pair rural distribution wire lead. The method of connecting the conductors of rural distribution wire in the terminal is indicated in *Figure* 37.

Figures 38 *to* 41 show types of terminals designed for use with 6-pair rural distribution wire. It should be noted that the guards and cable spacers ordinarily specified at the terminating points may be omitted if the conductors are dressed away from contact with the grounded hardware on the pole as indicated in these illustrations, and the conductors are taped at the break away points to hold them in place. In some cases, guards without cable spacers may be used.

Where 11- or 16-pair rural or urban type distribution wire is involved, 11- or 16-pair terminals, as required are employed as shown in *Figures* 42 *and* 43. No guards are used on the conductors at the break away points as indicated.

A recently developed terminal for 6-pair rural distribution wire that requires no cutting of the conductors for terminating is illustrated in *Figure* 44. A lag screw bracket (*Figure* 45) mounts the terminal on the pole and split grommets (*Figure* 46) enable the distribution wire conductors to be laid directly inside the terminal without cutting conductors.

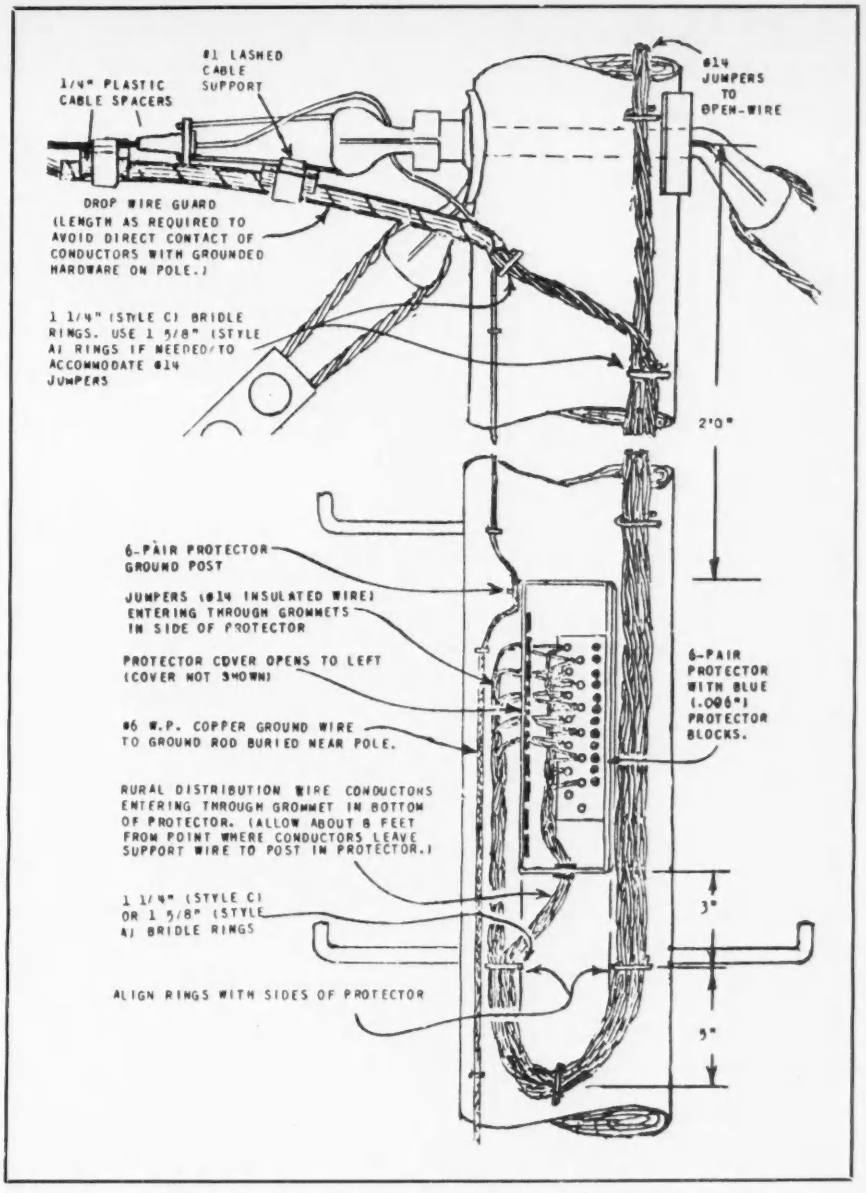

#1 LASHED CABLE SUPPORT
1/4" PLASTIC CABLE SPACERS
#14 JUMPERS TO OPEN-WIRE
DROP WIRE GUARD (LENGTH AS REQUIRED TO AVOID DIRECT CONTACT OF CONDUCTORS WITH GROUNDED HARDWARE ON POLE.)
1 1/4" (STYLE C) BRIDLE RINGS. USE 1 5/8" (STYLE A) RINGS IF NEEDED TO ACCOMMODATE #14 JUMPERS
2'0"
6-PAIR PROTECTOR GROUND POST
JUMPERS (#14 INSULATED WIRE) ENTERING THROUGH GROMMETS IN SIDE OF PROTECTOR
PROTECTOR COVER OPENS TO LEFT (COVER NOT SHOWN)
6-PAIR PROTECTOR WITH BLUE (.006") PROTECTOR BLOCKS.
#6 W.P. COPPER GROUND WIRE TO GROUND ROD BURIED NEAR POLE.
RURAL DISTRIBUTION WIRE CONDUCTORS ENTERING THROUGH GROMMET IN BOTTOM OF PROTECTOR. (ALLOW ABOUT 6 FEET FROM POINT WHERE CONDUCTORS LEAVE SUPPORT WIRE TO POST IN PROTECTOR.)
1 1/4" (STYLE C) OR 1 5/8" (STYLE A) BRIDLE RINGS
3"
ALIGN RINGS WITH SIDES OF PROTECTOR
5"

FIG. 34: — Terminating rural distribution wire in 6-pair protector for connecting to open wire, when protection is required.

All that is required is to mount the terminal on the pole in a horizontal position above or below the distribution wire pole attachment fixture with sufficient slack in the conductors for the connection. The necessary slack is obtained by cutting out a portion of the support wire and resplicing the cut ends of the support wire in the standard manner. The proper pairs are then pulled out for removing the insulation and connecting the bared conductors to the terminal posts, after which the grommets can be slipped over the distribution wire and the latter dressed into position inside the terminal.

This type of terminal can be equipped with protection for all or part of the pairs as indicated in *Figure* 47. The terminal is also available in 11- and 16-pair sizes for the corresponding pair sizes of distribution wire.

Use of Two-Wire Terminals For Connecting Single Pairs Of Distribution Wire

THERE ARE two methods in common use for terminating one or two pairs of rural distribution wire for connecting to subscribers drops or to jumpers from open-wire spurs. One makes use of 2-wire terminals mounted on the pole and the other employs 2-wire terminals designed to attach directly to the support wire.

The procedure for mounting 2-wire terminals on poles and connecting the terminal posts to the rural distribution wire conductors is illustrated in *Figures* 48 *and* 49. *Figure*

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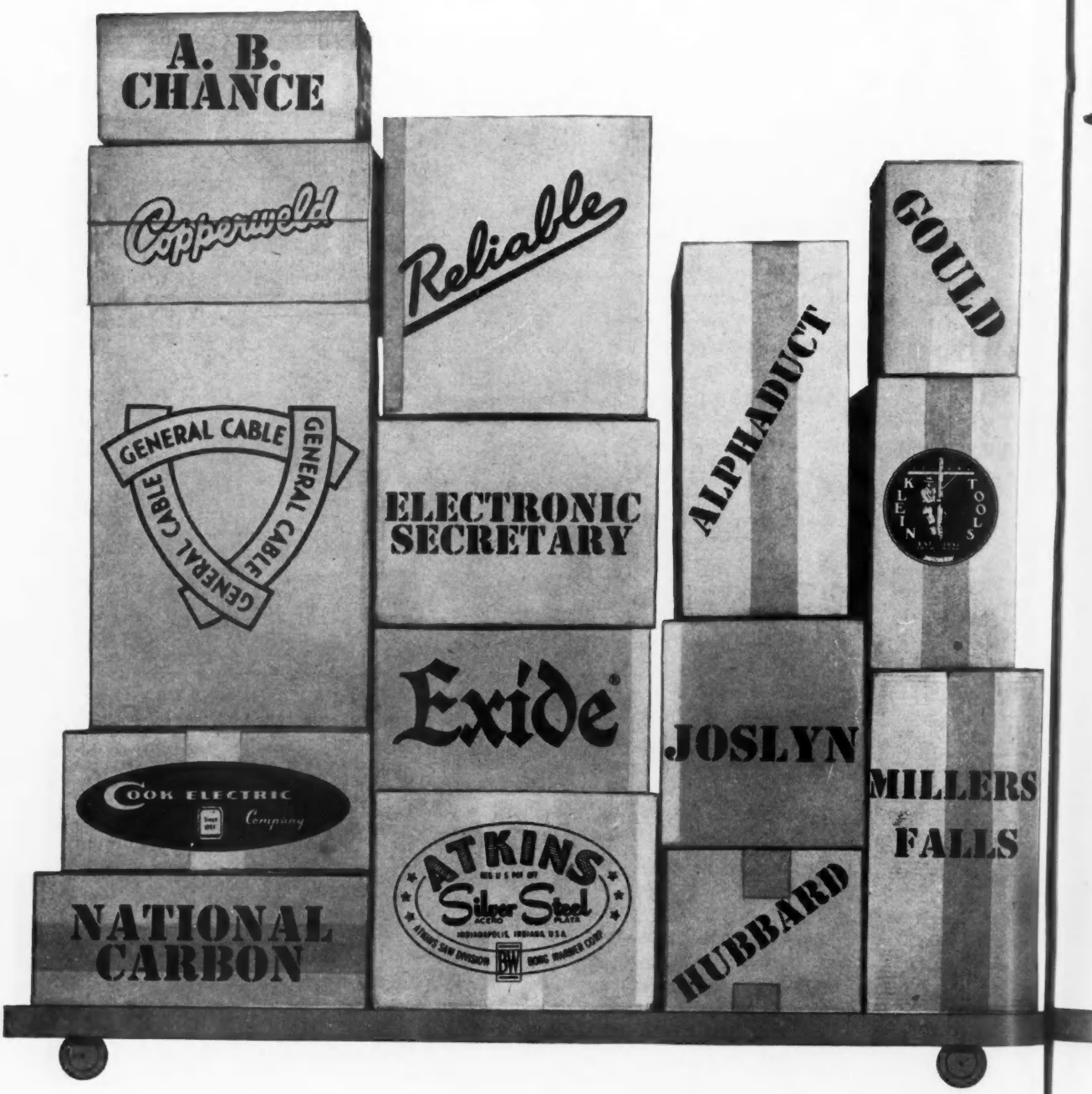

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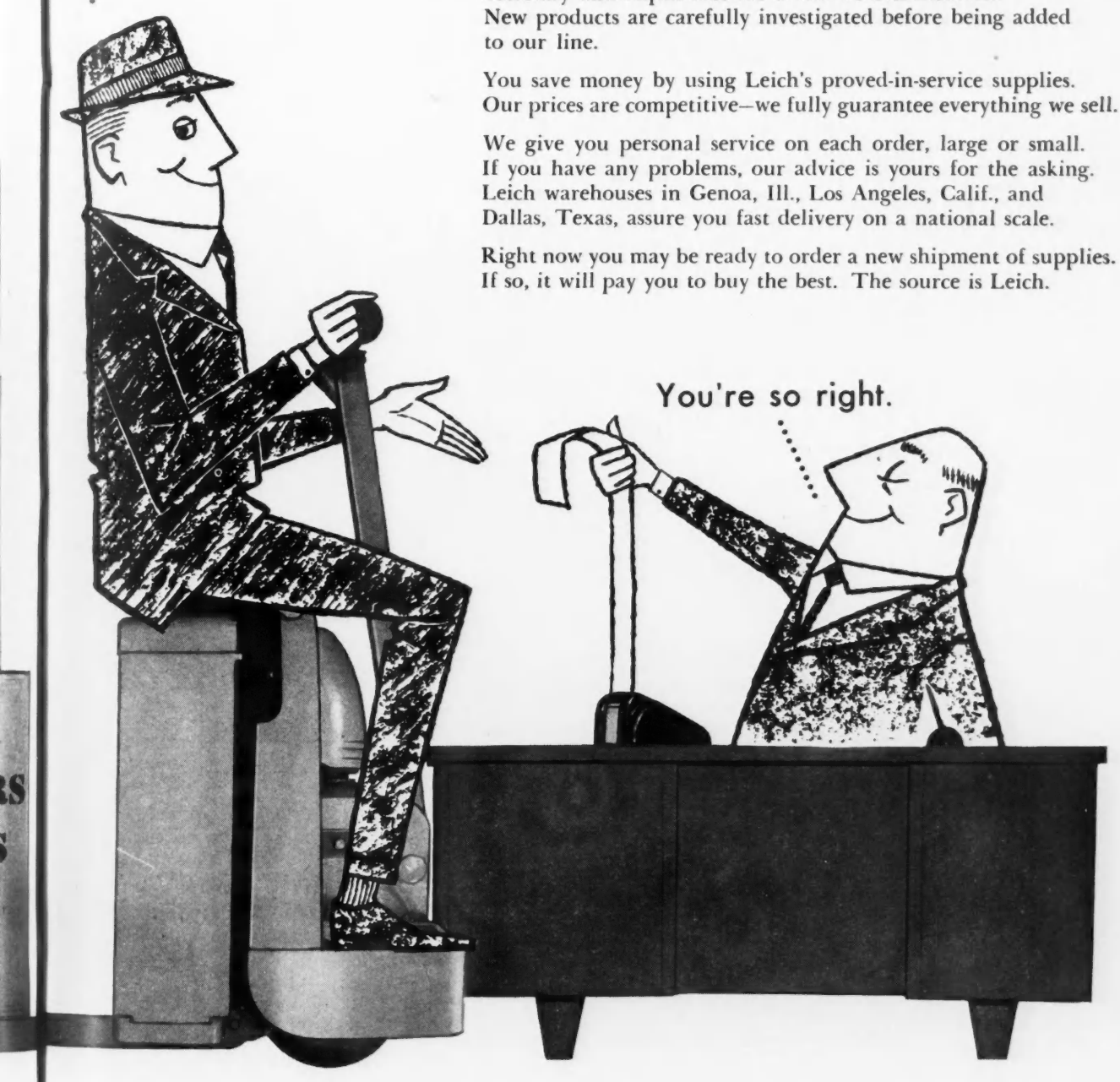

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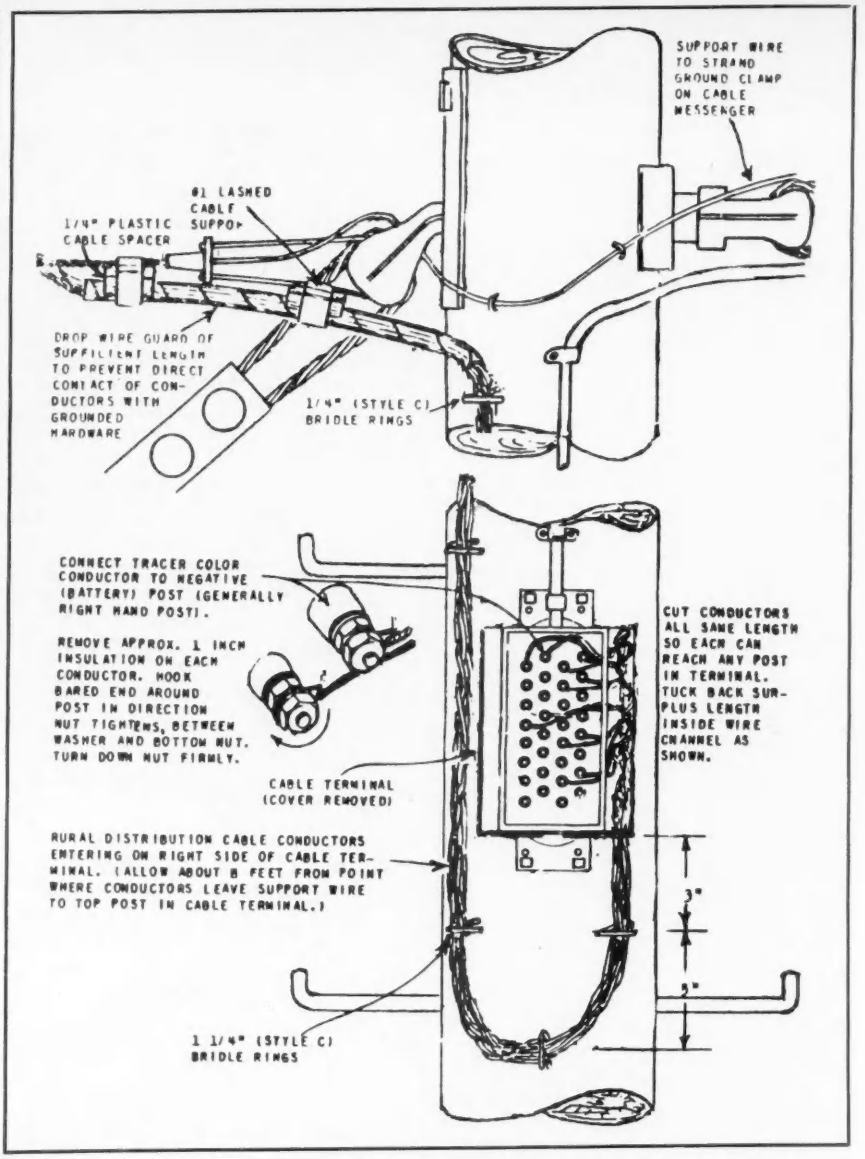
SUPPORT WIRE TO STRAND GROUND CLAMP ON CABLE MESSENGER
#1 LASHED CABLE SUPPORT
1/4" PLASTIC CABLE SPACER
DROP WIRE GUARD OF SUFFICIENT LENGTH TO PREVENT DIRECT CONTACT OF CONDUCTORS WITH GROUNDED HARDWARE
1/4" (STYLE C) BRIDLE RINGS
CONNECT TRACER COLOR CONDUCTOR TO NEGATIVE (BATTERY) POST (GENERALLY RIGHT HAND POST).
REMOVE APPROX. 1 INCH INSULATION ON EACH CONDUCTOR. HOOK BARED END AROUND POST IN DIRECTION NUT TIGHTENS, BETWEEN WASHER AND BOTTOM NUT. TURN DOWN NUT FIRMLY.
CUT CONDUCTORS ALL SAME LENGTH SO EACH CAN REACH ANY POST IN TERMINAL. TUCK BACK SURPLUS LENGTH INSIDE WIRE CHANNEL AS SHOWN.
CABLE TERMINAL (COVER REMOVED)
RURAL DISTRIBUTION CABLE CONDUCTORS ENTERING ON RIGHT SIDE OF CABLE TERMINAL. (ALLOW ABOUT 8 FEET FROM POINT WHERE CONDUCTORS LEAVE SUPPORT WIRE TO TOP POST IN CABLE TERMINAL.)
3"
3"
1 1/4" (STYLE C) BRIDLE RINGS

FIG. 35: — Terminating rural distribution wire directly in unprotected type cable terminal. If protection is required, a protected type terminal may be used, or a 6-pair protector may be installed on the opposite side of the pole and jumpers run between the protector and the cable terminal.

50 illustrates a typical 2-wire terminal designed for pole mounting.

As indicated in *Figure* 51, the two-post terminal designed for mounting on the support wire of rural distribution wire is made up of a molded plastic body with molded-in binding and mounting posts and a neoprene snap-on type cover.

The slots in opposite sides of the body are for the conductors of the rural distribution wire, while the slot on the side at right angles to the other slots is for the drop wire entrance. The binding posts are provided with one pronged washer, starting at the bottom, followed by a flat washer, then a ⅜ inch nut, two small washers, and another nut.

A stainless steel channel washer is provided on the mounting post on the back of the terminal body to clamp over the support wire. A lock washer is used between the channel washer and nut. The grooves on each side of the mounting post are to guide the support wire into place and keep the 2-wire terminal in the proper position.

The neoprene cap which snaps over the body provides a weather-tight covering over the connections between the drop and distribution wire conductors.

To mount the terminal, wooden wedges (*Figure* 52) are employed to separate the conductors from the support wire and a piece of plastic guard is placed over the bunched conductors, leaving the pair to be

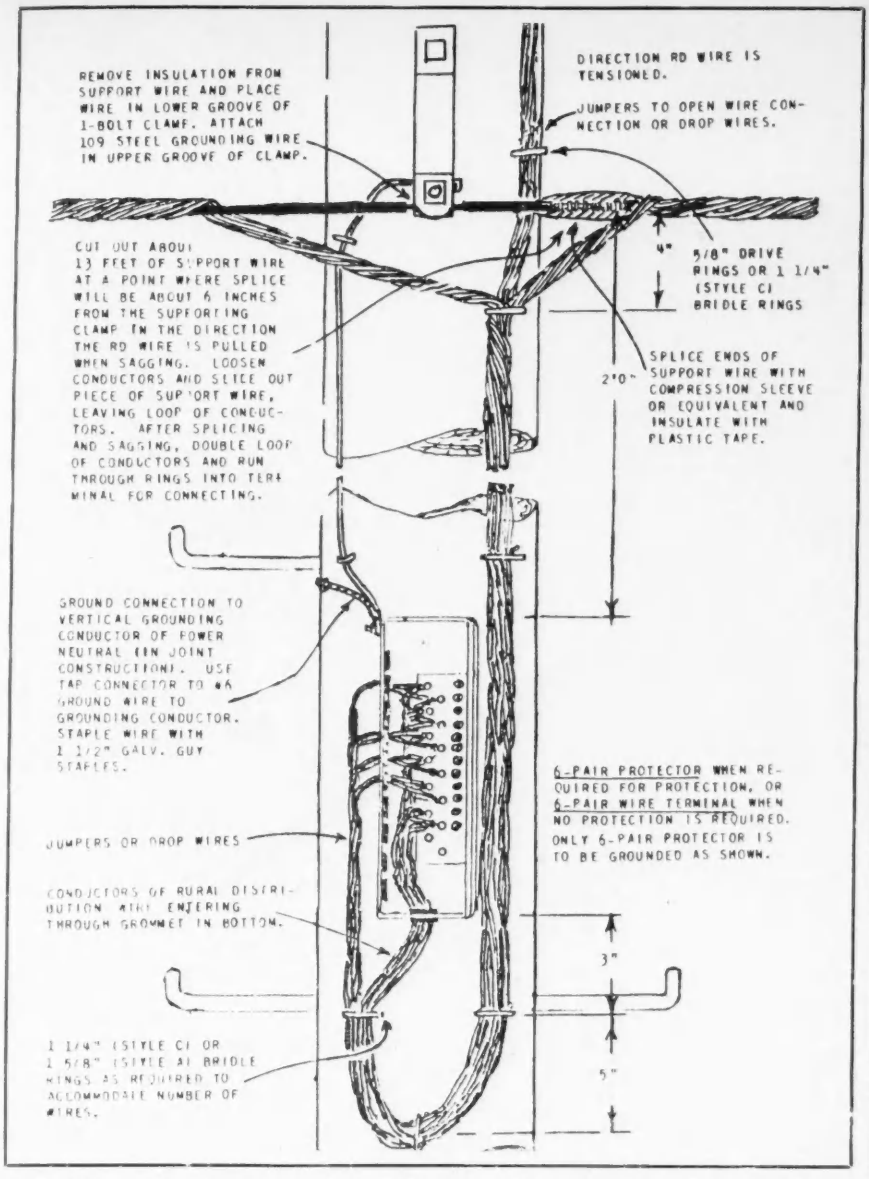
REMOVE INSULATION FROM SUPPORT WIRE AND PLACE WIRE IN LOWER GROOVE OF 1-BOLT CLAMP. ATTACH 109 STEEL GROUNDING WIRE IN UPPER GROOVE OF CLAMP.
DIRECTION RD WIRE IS TENSIONED.
JUMPERS TO OPEN WIRE CONNECTION OR DROP WIRES.
CUT OUT ABOUT 13 FEET OF SUPPORT WIRE AT A POINT WHERE SPLICE WILL BE ABOUT 6 INCHES FROM THE SUPPORTING CLAMP IN THE DIRECTION THE RD WIRE IS PULLED WHEN SAGGING. LOOSEN CONDUCTORS AND SLICE OUT PIECE OF SUPPORT WIRE, LEAVING LOOP OF CONDUCTORS. AFTER SPLICING AND SAGGING, DOUBLE LOOP OF CONDUCTORS AND RUN THROUGH RINGS INTO TERMINAL FOR CONNECTING.
4"
5/8" DRIVE RINGS OR 1 1/4" (STYLE C) BRIDLE RINGS
2'0"
SPLICE ENDS OF SUPPORT WIRE WITH COMPRESSION SLEEVE OR EQUIVALENT AND INSULATE WITH PLASTIC TAPE.
GROUND CONNECTION TO VERTICAL GROUNDING CONDUCTOR OF POWER NEUTRAL (IN JOINT CONSTRUCTION). USE TAP CONNECTOR TO #6 GROUND WIRE TO GROUNDING CONDUCTOR. STAPLE WIRE WITH 1 1/2" GALV. GUY STAPLES.
6-PAIR PROTECTOR WHEN REQUIRED FOR PROTECTION, OR 6-PAIR WIRE TERMINAL WHEN NO PROTECTION IS REQUIRED. ONLY 6-PAIR PROTECTOR IS TO BE GROUNDED AS SHOWN.
JUMPERS OR DROP WIRES
CONDUCTORS OF RURAL DISTRIBUTION CABLE ENTERING THROUGH GROMMET IN BOTTOM.
3"
5"
1 1/4" (STYLE C) OR 1 5/8" (STYLE A) BRIDLE RINGS AS REQUIRED TO ACCOMMODATE NUMBER OF WIRES.

FIG. 36: — Terminating rural distribution cable in 6-pair protector or 6-pair wire terminal.

connected outside. The terminal body is then slipped into position with the support wire inside the channel washer and the outside grooves on the terminal. The terminal body is adjusted to a 30 degree angle to enable the drop wire to come downward for looping up and taping to the rural distribution wire. The nut on the outside mounting post is tightened with a socket wrench to set the adjustment permanently.

The conductors of the selected pair are skinned in the proper location, the bared positions placed between the bottom washers of the binding posts, and the bottom nut turned down tight. The ends of the drop wire conductors are then skinned and the bared ends hooked around the binding posts between the upper washers and the upper nut turned down on them. This connecting procedure is illustrated in *Figure* 51 (*b*). It is important to note that the tracer conductors should be connected together on the same right hand post to maintain proper polarity of the connections.

The neoprene cover is then snapped in place to complete the connecting

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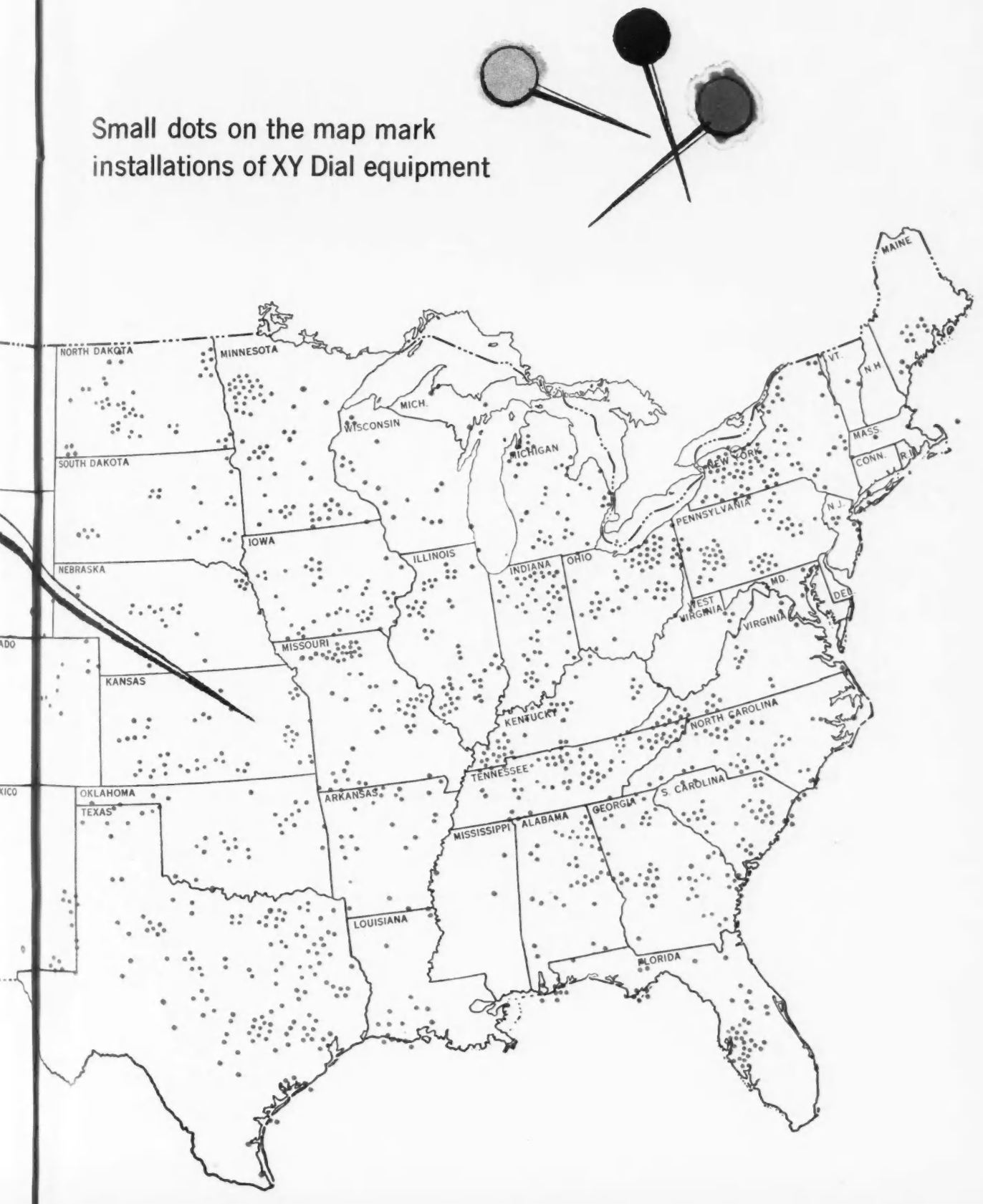


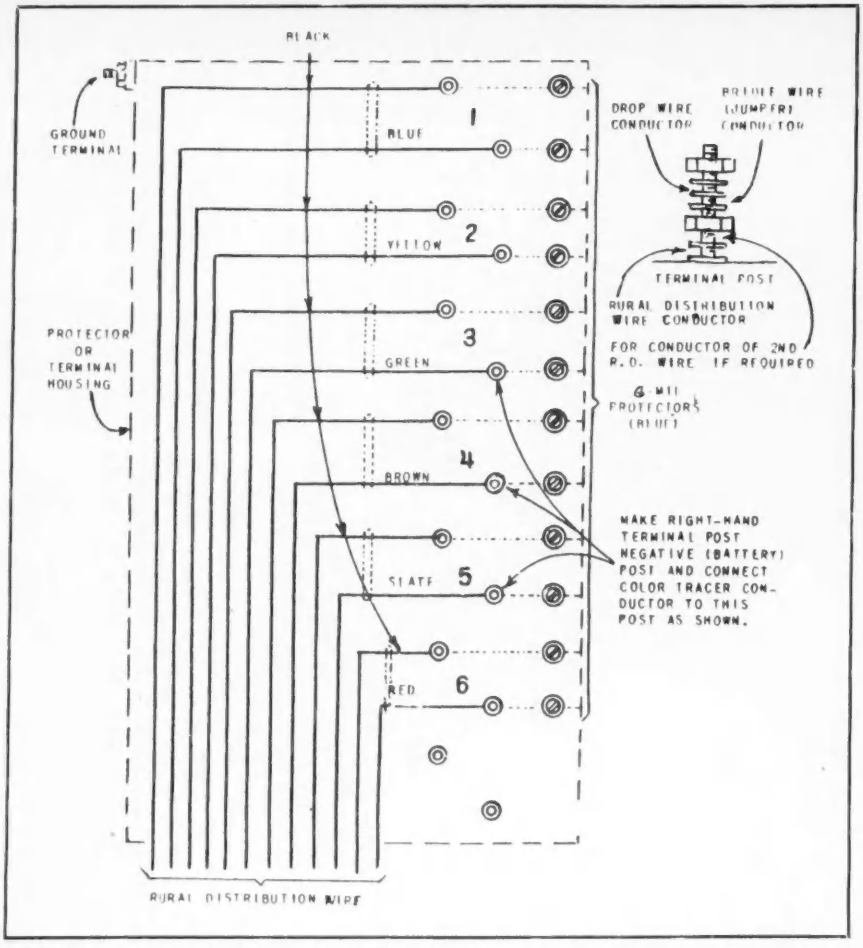


FIG. 37: — Typical wiring scheme for 6-pair protector or 6-pair wire terminal.

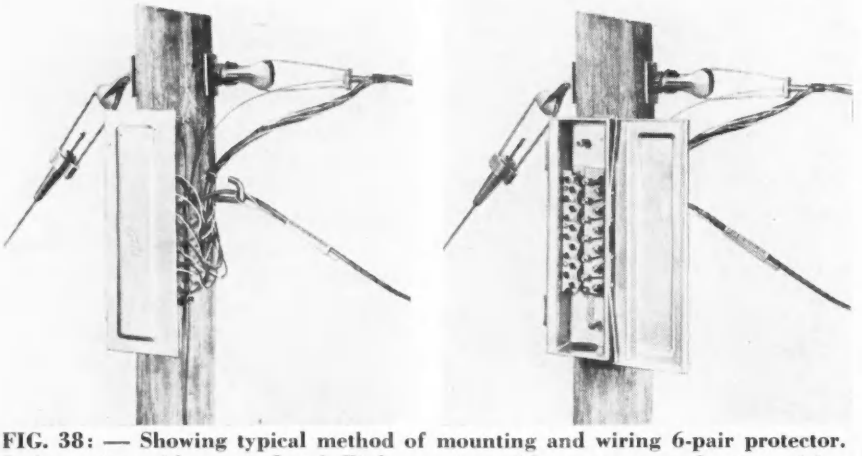


FIG. 38: — Showing typical method of mounting and wiring 6-pair protector. Left — view with cover closed. Right — view with cover open, showing wiring arrangement. (Courtesy of Reliable Electric Company.)

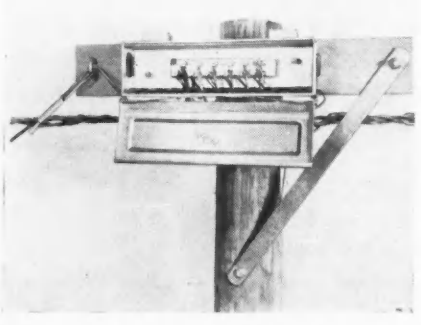


FIG. 39 (left): — Showing wiring of 6-pair wire terminal. (Courtesy of Reliable Electric Company.)

FIG. 42 (right): — Protected terminal on urban type distribution wire connecting at intermediate point to terminal on underground cable. Note method of bringing conductors into terminal to avoid necessity for protecting bunched conductors with plastic guards.

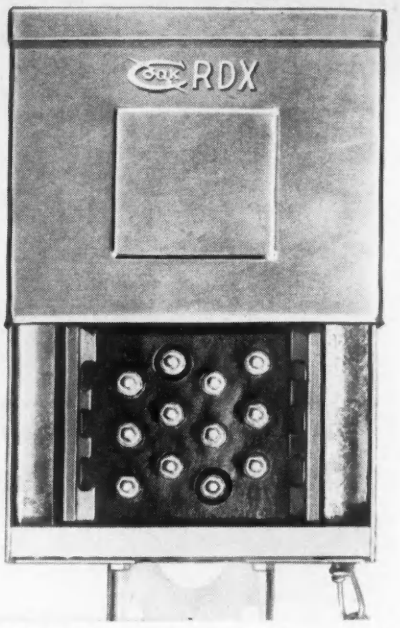


FIG. 40: — Cook Electric Company's RDX terminal for terminating rural distribution wire.

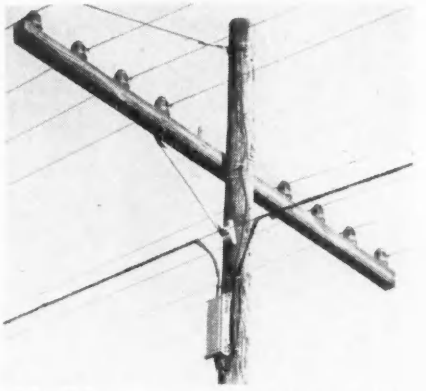
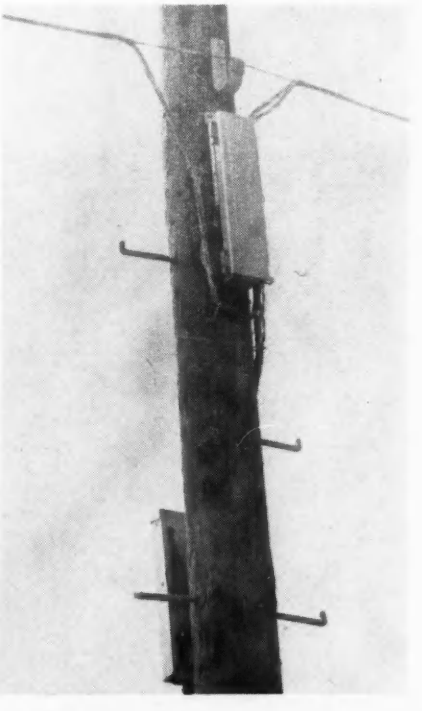


FIG. 41: — Typical installation of 6-pair protector on rural distribution wire lead.



procedure as indicated in *Figure* 51 (*c*). The drop wire is looped up to the distribution wire and taped thereto with vinyl plastic tape before continuing to the pole attachment. The complete installation of two terminals at a pole is illustrated in *Figure* 53. *Figure* 54 also shows a 2-wire terminal installation on rural distribution wire carried on crossarms.

Two operations are involved in the splicing of rural distribution wire, one to connect together the corresponding conductors of the distribution wire sections.

It is desirable to work on the ground when splicing together the distribution wire sections. After the support wire is properly joined, it should be raised to a convenient height for splicing the conductors.

Figure 55 illustrates the steps of

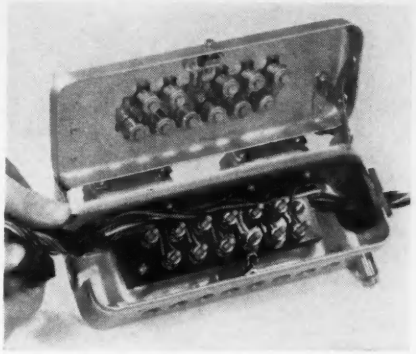


FIG. 46: — Illustrating use of split grommets in RDW Tap terminal.

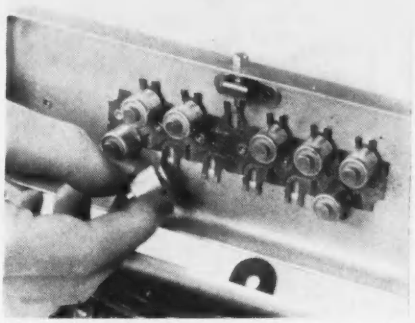


FIG. 47: — How protection can be applied in the RDW Tap terminal whenever this is required.

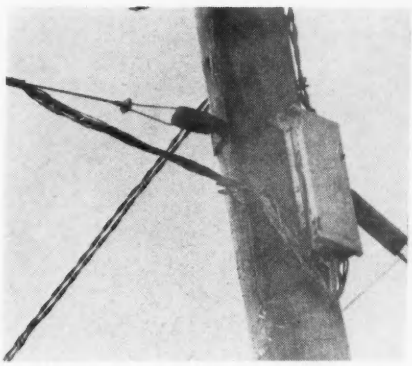


FIG. 43: — Terminating urban distribution wire at end of lead. Note use of automatic type grip to dead end support wire on thimble eye fixture on pole.

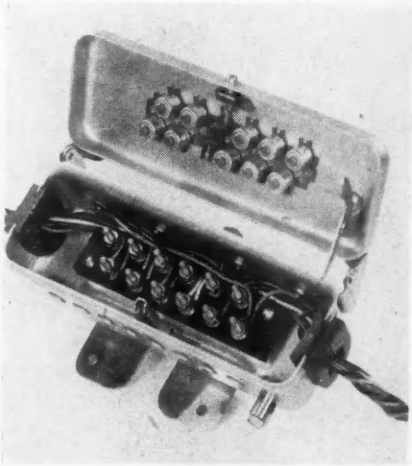


FIG. 44: — Cook Electric Company's RDW Tap terminal for connecting rural distribution wire without cutting conductors when used at intermediate points.

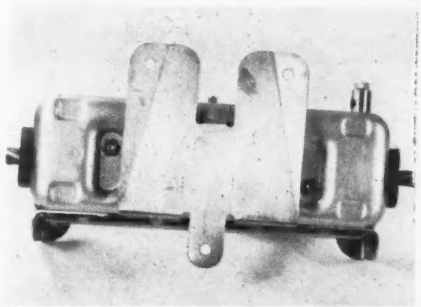


FIG. 45: — Showing view of bracket for mounting Cook Electric RDW Tap terminal.

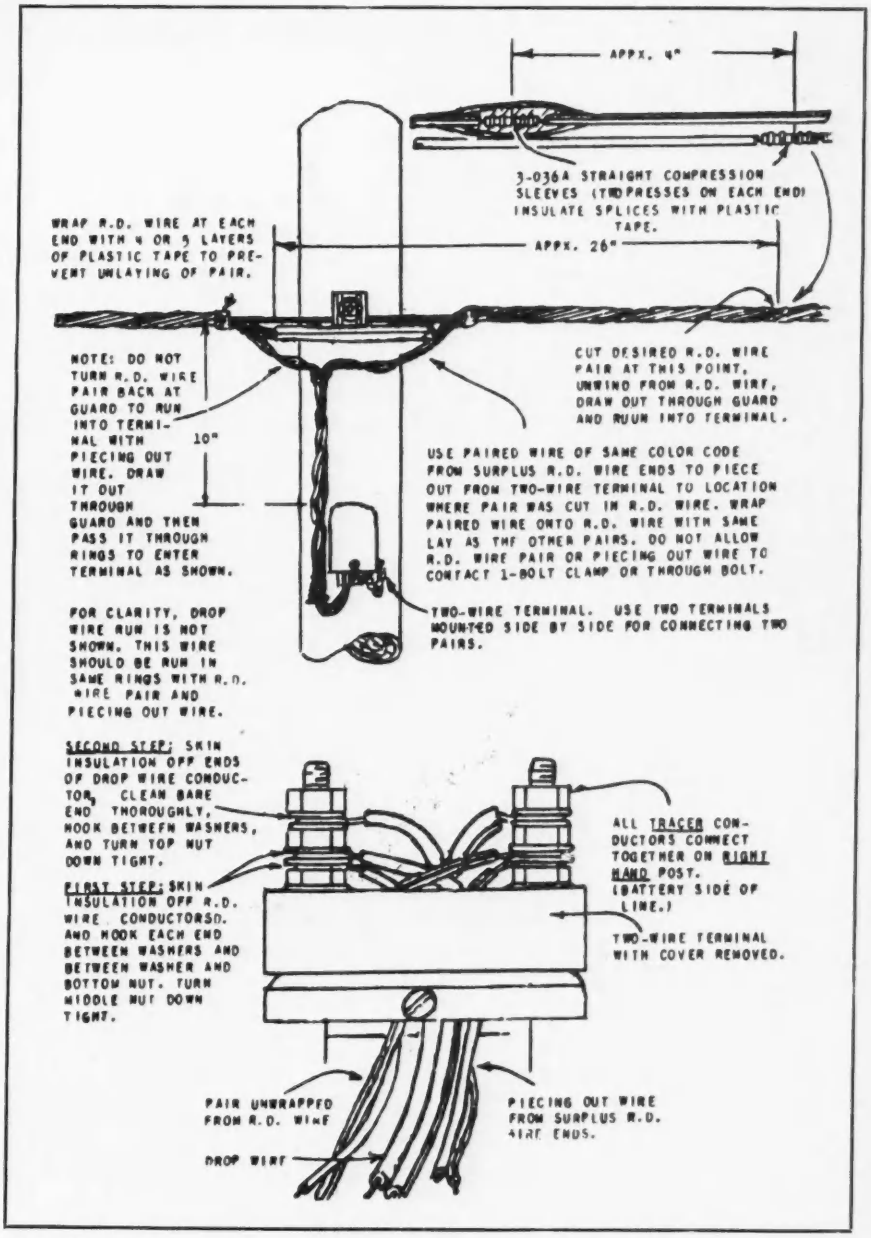

APPX. 4"
3-036A STRAIGHT COMPRESSION SLEEVES (TWO PRESSES ON EACH END) INSULATE SPLICES WITH PLASTIC TAPE.
APPX. 26"
WRAP R.D. WIRE AT EACH END WITH 4 OR 5 LAYERS OF PLASTIC TAPE TO PREVENT UNLAYING OF PAIR.
NOTE: DO NOT TURN R.D. WIRE PAIR BACK AT GUARD TO RUN INTO TERMINAL WITH PIECING OUT WIRE. DRAW IT OUT THROUGH GUARD AND THEN PASS IT THROUGH RINGS TO ENTER TERMINAL AS SHOWN.
10"
CUT DESIRED R.D. WIRE PAIR AT THIS POINT, UNWIND FROM R.D. WIRE, DRAW OUT THROUGH GUARD AND RUUN INTO TERMINAL.
USE PAIRED WIRE OF SAME COLOR CODE FROM SURPLUS R.D. WIRE ENDS TO PIECE OUT FROM TWO-WIRE TERMINAL TO LOCATION WHERE PAIR WAS CUT IN R.D. WIRE. WRAP PAIRED WIRE ONTO R.D. WIRE WITH SAME LAY AS THE OTHER PAIRS. DO NOT ALLOW R.D. WIRE PAIR OR PIECING OUT WIRE TO CONTACT 1-BOLT CLAMP OR THROUGH BOLT.
TWO-WIRE TERMINAL. USE TWO TERMINALS MOUNTED SIDE BY SIDE FOR CONNECTING TWO PAIRS.
FOR CLARITY, DROP WIRE RUN IS NOT SHOWN. THIS WIRE SHOULD BE RUN IN SAME RINGS WITH R.D. WIRE PAIR AND PIECING OUT WIRE.
SECOND STEP: SKIN INSULATION OFF ENDS OF DROP WIRE CONDUCTOR, CLEAN BARE END THOROUGHLY, HOOK BETWEEN WASHERS, AND TURN TOP NUT DOWN TIGHT.
FIRST STEP: SKIN INSULATION OFF R.D. WIRE CONDUCTORS, AND HOOK EACH END BETWEEN WASHERS AND BETWEEN WASHER AND BOTTOM NUT. TURN MIDDLE NUT DOWN TIGHT.
ALL TRACER CONDUCTORS CONNECT TOGETHER ON RIGHT HAND POST. (BATTERY SIDE OF LINE.)
TWO-WIRE TERMINAL WITH COVER REMOVED.
PAIR UNWRAPPED FROM R.D. WIRE
DROP WIRE
PIECING OUT WIRE FROM SURPLUS R.D. WIRE ENDS.

FIG. 48: — Method of connecting rural distribution wire pair in 2-wire terminal designed to mount on pole.

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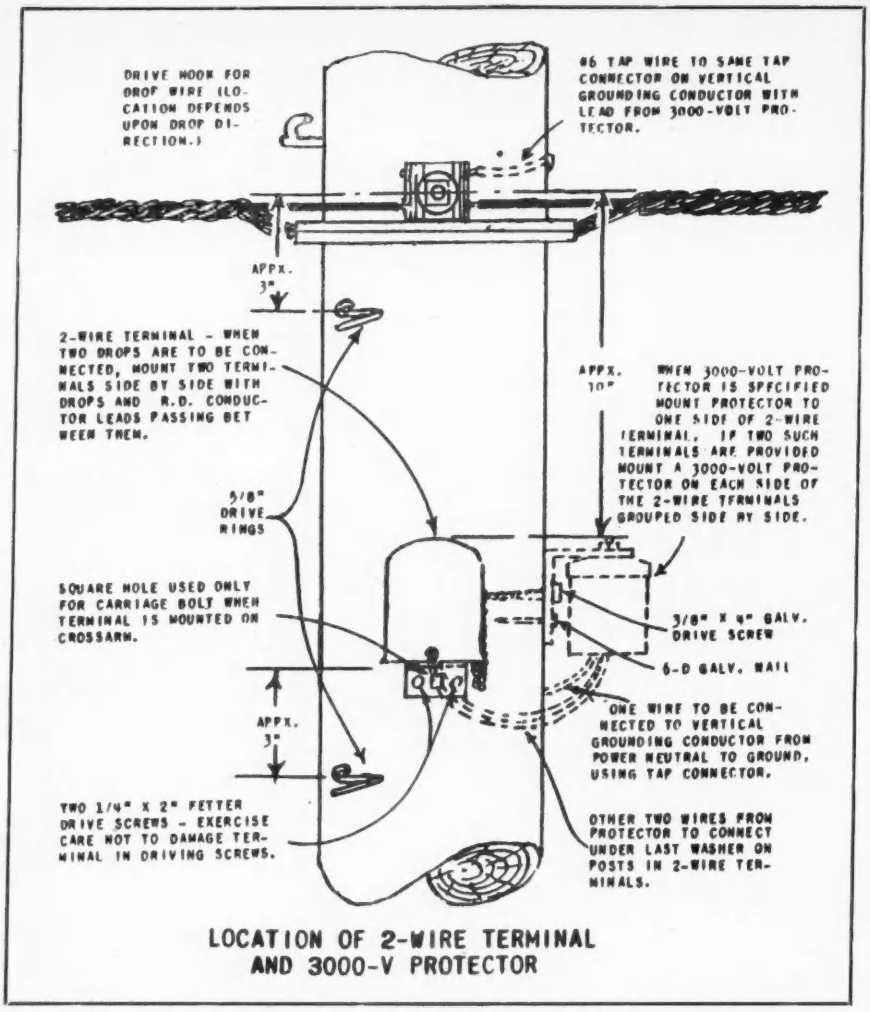
DRIVE HOOK FOR DROP WIRE (LOCATION DEPENDS UPON DROP DIRECTION.)
#6 TAP WIRE TO SAME TAP CONNECTOR ON VERTICAL GROUNDING CONDUCTOR WITH LEAD FROM 3000-VOLT PROTECTOR.
APPX. 3"
2-WIRE TERMINAL - WHEN TWO DROPS ARE TO BE CONNECTED, MOUNT TWO TERMINALS SIDE BY SIDE WITH DROPS AND R.D. CONDUCTOR LEADS PASSING BETWEEN THEM.
APPX. 10"
WHEN 3000-VOLT PROTECTOR IS SPECIFIED MOUNT PROTECTOR TO ONE SIDE OF 2-WIRE TERMINAL. IF TWO SUCH TERMINALS ARE PROVIDED MOUNT A 3000-VOLT PROTECTOR ON EACH SIDE OF THE 2-WIRE TERMINALS GROUPED SIDE BY SIDE.
5/8" DRIVE RINGS
SQUARE HOLE USED ONLY FOR CARRIAGE BOLT WHEN TERMINAL IS MOUNTED ON CROSSARM.
3/8" X 4" GALV. DRIVE SCREW
6-D GALV. NAIL
APPX. 3"
ONE WIRE TO BE CONNECTED TO VERTICAL GROUNDING CONDUCTOR FROM POWER NEUTRAL TO GROUND, USING TAP CONNECTOR.
TWO 1/4" X 2" FETTER DRIVE SCREWS - EXERCISE CARE NOT TO DAMAGE TERMINAL IN DRIVING SCREWS.
OTHER TWO WIRES FROM PROTECTOR TO CONNECT UNDER LAST WASHER ON POSTS IN 2-WIRE TERMINALS.
LOCATION OF 2-WIRE TERMINAL AND 3000-V PROTECTOR

FIG. 49: — Use of high-voltage type protector with 2-wire pole mounted terminal.

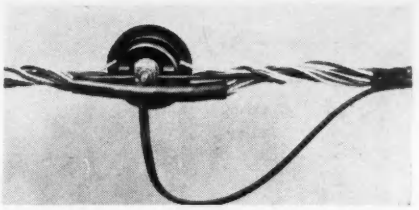

FIG. 51 (a): — Showing how the Reliable #5500 2-wire terminal is mounted on the support wire of rural distribution wire. Note plastic guard placed to protect conductors from abrasion on terminal.

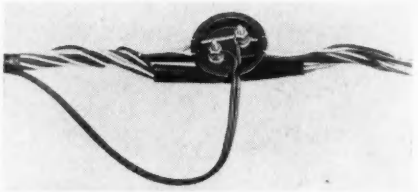

FIG. 51 (b): — Illustrating method of connecting distribution wire pair and drop conductors in the 2-wire terminal.

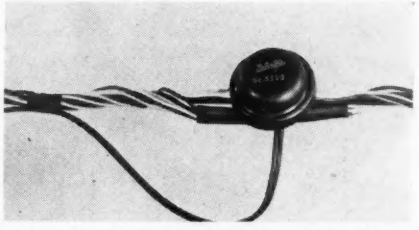

FIG. 51 (c): — Showing completed installation of the 2-wire terminal.

splicing the support wire and the conductors of the rural distribution wire. In this procedure the use of a compression type sleeve for splicing the support wire is pictured.

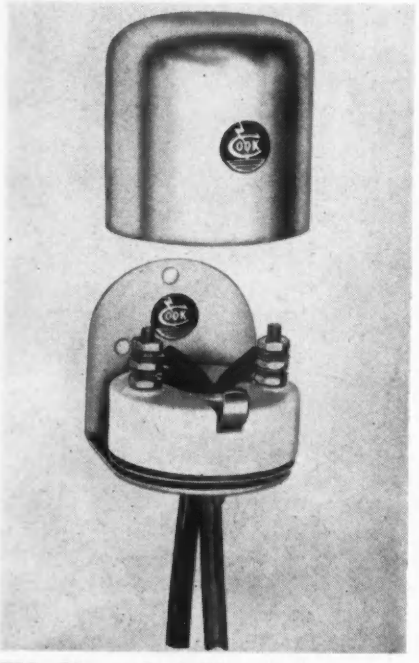

FIG. 50: — Cook Electric Company's two wire terminal for pole mounting.

An automatic type grip (Wirelink) can be used to accomplish the same result quickly and easily. Where the splice will not touch the wire guard it is satisfactory to omit the tape insulation from the support wire splice.

Rural Distribution Wire Loading

RURAL DISTRIBUTION wire can be employed with good transmission in lengths of up to about 18,000 feet (3½ miles) without loading and about 50,000 feet (9½ miles) with maximum loading. The loss for these lengths of non-loaded and loaded distribution wire circuits is about the same as for standard 19-gauge lead-covered cable.

Loading consists simply of inserting coils of a specified inductance value at specified intervals in the distribution wire circuits. There are a number of such loading systems in use. Those considered most suitable for rural distribution wire are the H-44 and H-88 systems. The H-44 system is intended for use on circuits having no more than four loading points and a minimum overall length of 12,000 feet. For more than four loading points, H-88 loading coils should be installed with a minimum overall circuit length of 18,000 feet.

FIG. 52: — Lineman installing a 2-wire terminal on support wire of rural distribution wire. Note use of wooden wedges to separate conductors from support wire.

Normal spacings between the loading points for H-44 and H-88 load-

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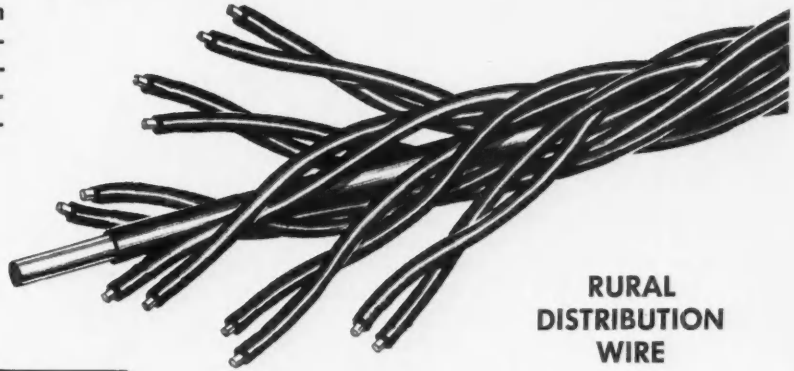

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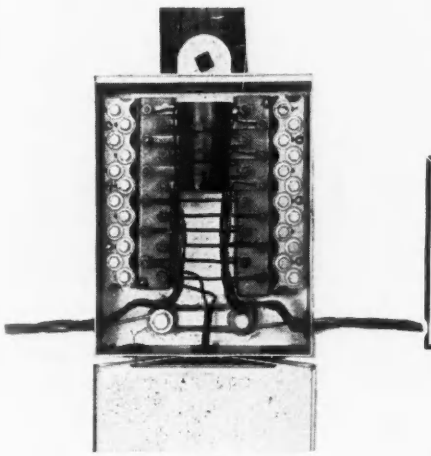

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Copper Line Wire
Steel Line Wire
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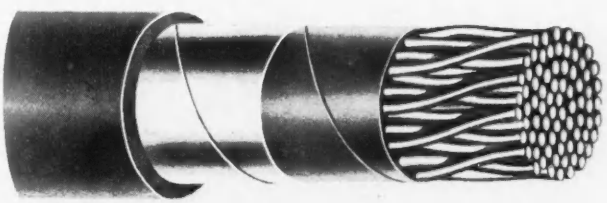

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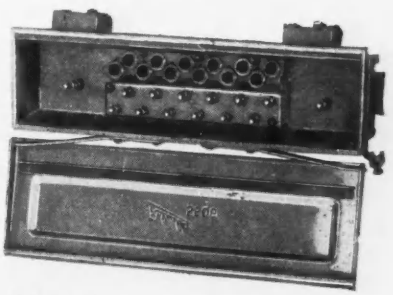

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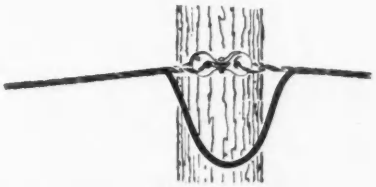
Superior cable in 24,22 or 19 AWG conductors, 6 thru 404 pairs. Irradiated Polyethylene tape, aluminum shield, Polyethylene jacket. Also other cables on hand to meet your particular requirements.

WIRE TERMINALS

Reliable and Cook protected and unprotected terminals. All types in stock.



PREFORMED PRODUCTS

Deadends, grips and supports for all wires and strands. Preformed for fast installation.

"C" RURAL TERMINAL

Drop wire terminal by Superior for making drops from "C" Rural Parallel Line Wires.

STRAND TERMINALS

11,16 and 26 pair, protected or unprotected, plastic or lead stubs. Complete line of Cook and Reliable Terminals.

BUCKEYE TELEPHONE & SUPPLY CO.

P. O. Box 5707 **Phone HU 8-0655** **Columbus 21, Ohio**

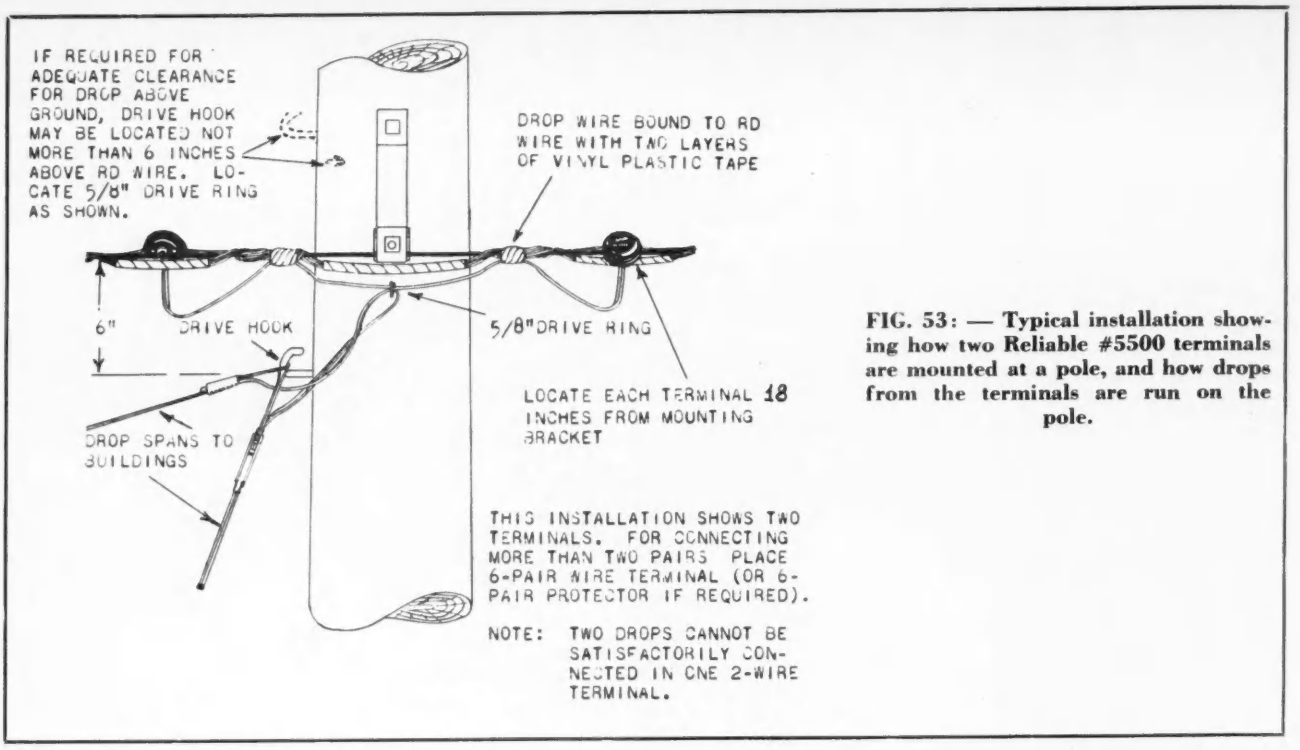

IF REQUIRED FOR ADEQUATE CLEARANCE FOR DROP ABOVE GROUND, DRIVE HOOK MAY BE LOCATED NOT MORE THAN 6 INCHES ABOVE RD WIRE. LOCATE 5/8" DRIVE RING AS SHOWN.
DROP WIRE BOUND TO RD WIRE WITH TWO LAYERS OF VINYL PLASTIC TAPE
6"
DRIVE HOOK
5/8" DRIVE RING
LOCATE EACH TERMINAL 18 INCHES FROM MOUNTING BRACKET
DROP SPANS TO BUILDINGS
THIS INSTALLATION SHOWS TWO TERMINALS. FOR CONNECTING MORE THAN TWO PAIRS PLACE 6-PAIR WIRE TERMINAL (OR 6-PAIR PROTECTOR IF REQUIRED).
NOTE: TWO DROPS CANNOT BE SATISFACTORILY CONNECTED IN ONE 2-WIRE TERMINAL.

FIG. 53: — Typical installation showing how two Reliable #5500 terminals are mounted at a pole, and how drops from the terminals are run on the pole.

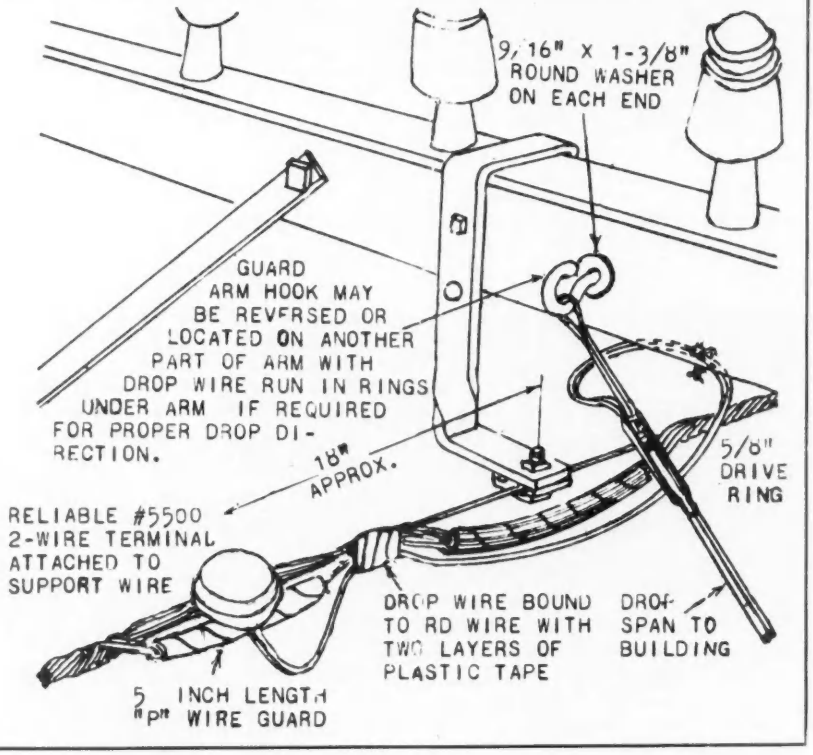

9/16" X 1-3/8" ROUND WASHER ON EACH END
GUARD ARM HOOK MAY BE REVERSED OR LOCATED ON ANOTHER PART OF ARM WITH DROP WIRE RUN IN RINGS UNDER ARM IF REQUIRED FOR PROPER DROP DIRECTION.
18" APPROX.
5/8" DRIVE RING
RELIABLE #5500 2-WIRE TERMINAL ATTACHED TO SUPPORT WIRE
DROP WIRE BOUND TO RD WIRE WITH TWO LAYERS OF PLASTIC TAPE
DROP SPAN TO BUILDING
5 INCH LENGTH "P" WIRE GUARD

FIG. 54: — Mounting Reliable #5500 2-wire terminal on support wire attached to crossarm and running drop wire to attachment on crossarm.

ing coils are set at 6,000 feet. The spacings should be as nearly uniform as possible to minimize losses which would nullify the effectiveness of the loading arrangement. For average spacings, the variations should not exceed 180 feet, plus or minus, and any single loading section should not vary more than 5 per cent from the average spacing, about 300 feet, plus or minus.

The end section, which is the distance from the central office to the first loading point at each end of the loaded circuits, is one-half of the regular loading section or 3,000 feet. Here the variation in the length should not be greater than 300 feet, plus or minus.

It is of interest to note that the code designations of the loading coils indicate the number of millihenries inductance and the length of the loading sections. Thus the "88" in H-88 means millihenries and the letter H shows the loading coil spacings to be 6,000 feet.

Figure 56 illustrates a terminal loading case designed for use with rural distribution cable. The case is made of cast aluminum and is provided with a hinge pressed aluminum cover. In this illustration, the distri-

A communications utility used its 702 to dig 18,000' a month. One job—opening 2500'—cost one-third of the estimate . . . establishing a new low for underground cable installation.

Now you can place your cable underground at low cost

The many advantages of having electric and telephone cables underground have long been recognized. The chief obstacle has been the cost of digging and backfilling the required trench.

The new Barber-Greene 702 Ditcher has solved this problem. Despite its small size, the 702 is the newest machine in the most rugged line of ditchers made.

Prior to this new development, available machines either dug too wide for practical and economical operation, or did not have the stamina and digability required for coping with unfavorable conditions.

Utilities, contractors and railroads are now gaining the advantages of underground lines and services in virtually every area of the country.

Applications, to date, include electric power and telephone lines and house services, railroad signal systems, traffic control systems, outdoor theater wiring, installations of small gas and water lines and services, lawn sprinkling systems, and others.

Digs to 40" deep, 5" wide. The 702 can be towed or carried on a light truck. Simple dual controls permit operation from seat or from side of machine for full view of trench.

56-10-D

Write for literature on this important, new, low-cost ditcher

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

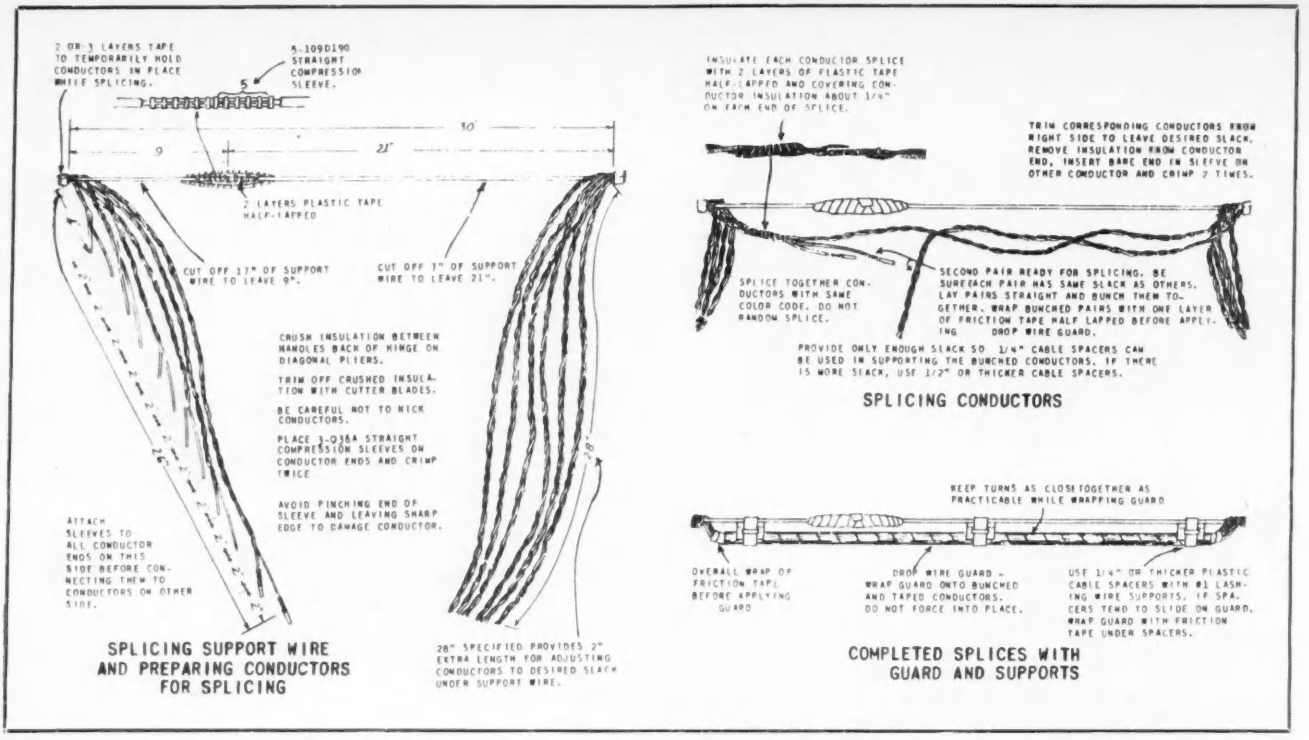

2 OR 3 LAYERS TAPE TO TEMPORARILY HOLD CONDUCTORS IN PLACE WHILE SPLICING.
S-109D190 STRAIGHT COMPRESSION SLEEVE.
30"
9"
21"
2 LAYERS PLASTIC TAPE HALF-LAPPED
CUT OFF 12" OF SUPPORT WIRE TO LEAVE 9".
CUT OFF 7" OF SUPPORT WIRE TO LEAVE 21".
CRUSH INSULATION BETWEEN HANDLES BACK OF HINGE ON DIAGONAL PLIERS.
TRIM OFF CRUSHED INSULATION WITH CUTTER BLADES.
BE CAREFUL NOT TO NICK CONDUCTORS.
PLACE 1-D38A STRAIGHT COMPRESSION SLEEVES ON CONDUCTOR ENDS AND CRIMP TWICE
AVOID PINCHING END OF SLEEVE AND LEAVING SHARP EDGE TO DAMAGE CONDUCTOR.
ATTACH SLEEVES TO ALL CONDUCTOR ENDS ON THIS SIDE BEFORE CONNECTING THEM TO CONDUCTORS ON OTHER SIDE.
28"
SPLICING SUPPORT WIRE AND PREPARING CONDUCTORS FOR SPLICING
28" SPECIFIED PROVIDES 2" EXTRA LENGTH FOR ADJUSTING CONDUCTORS TO DESIRED SLACK UNDER SUPPORT WIRE.
INSULATE EACH CONDUCTOR SPLICE WITH 2 LAYERS OF PLASTIC TAPE HALF-LAPPED AND COVERING CONDUCTOR INSULATION ABOUT 1/4" ON EACH END OF SPLICE.
TRIM CORRESPONDING CONDUCTORS FROM RIGHT SIDE TO LEAVE DESIRED SLACK. REMOVE INSULATION FROM CONDUCTOR END, INSERT BARE END IN SLEEVE ON OTHER CONDUCTOR AND CRIMP 2 TIMES.
SPLICE TOGETHER CONDUCTORS WITH SAME COLOR CODE. DO NOT RANDOM SPLICE.
SECOND PAIR READY FOR SPLICING. BE SURE EACH PAIR HAS SAME SLACK AS OTHERS. LAY PAIRS STRAIGHT AND BUNCH THEM TOGETHER. WRAP BUNCHED PAIRS WITH ONE LAYER OF FRICTION TAPE HALF LAPPED BEFORE APPLYING DROP WIRE GUARD.
PROVIDE ONLY ENOUGH SLACK SO 1/4" CABLE SPACERS CAN BE USED IN SUPPORTING THE BUNCHED CONDUCTORS. IF THERE IS MORE SLACK, USE 1/2" OR THICKER CABLE SPACERS.
SPLICING CONDUCTORS
KEEP TURNS AS CLOSE TOGETHER AS PRACTICABLE WHILE WRAPPING GUARD
OVERALL WRAP OF FRICTION TAPE BEFORE APPLYING GUARD
DROP WIRE GUARD - WRAP GUARD ONTO BUNCHED AND TAPED CONDUCTORS. DO NOT FORCE INTO PLACE.
USE 1/4" OR THICKER PLASTIC CABLE SPACERS WITH #1 LASHING WIRE SUPPORTS. IF SPACERS TEND TO SLIDE ON GUARD, WRAP GUARD WITH FRICTION TAPE UNDER SPACERS.
COMPLETED SPLICES WITH GUARD AND SUPPORTS

FIG. 55: — Steps involved in splicing rural distribution wire.

bution wire is shown dead ended inside the case. This is an optional arrangement and the distribution wire may be carried past the terminal on a pole fixture with the conductors brought inside the terminal as shown in *Figure* 57. If required, the case may be grounded by terminating the ground lead on one of the bolts used for dead ending the support wire inside the case.

Protection is provided for the loading coils by fuseless type protectors as shown in *Figure* 56. This is needed where lightning incidence is high and the coils might be burned out by lightning discharges entering the distribution wire.

The loading coils may be either 88 or 44 millihenries inductance as required. The 88 millihenry coils provide better transmission efficiency, since the loss with these coils is approximately 0.48 db per mile, while the loss with the 44 millihenry coils is 0.40 db per mile. — *End of Operating Manual on Rural Distribution Wire.*

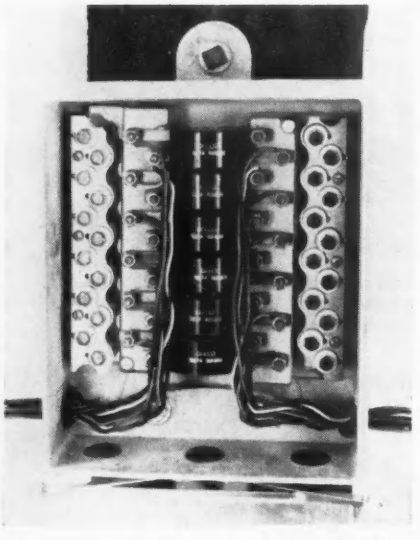


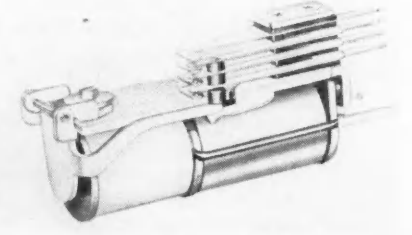
FIG. 56: — Communication Equipment and Engineering Company's Type 177 terminal loading case for 6-pair rural distribution wire. Note the internal dead ending feature provided in the case.

FIG. 57: — Typical installation of a terminal loading case with the rural distribution wire carried outside the case and conductors brought into the terminal from the bottom.

Guardian Electric Announces New Telephone Relay

A NEW telephone relay, adjusted and tested to strict telephone relay adjustment practices, has been announced by Guardian Electric Manufacturing Co.

The relay has contact combinations up to 10 pole, double throw. Contacts are rated for 3 amperes, 150 watts, A. C., non-inductive load. The relay can be supplied with copper head for delayed attract up to 0.1 second depending upon spring assembly and coil power; copper heel for delayed release up to 0.4 second with small spring assembly and power coil.



New telephone relay.

The new telephone relay is equal to and interchangeable with other telephone relays now being used. For complete details about the new Guardian Telephone Relay, write to Guardian Electric Manufacturing Co., Dept. T-E-M, 1621 West Walnut St., Chicago 12, Ill.

Portable Power Plant Mounted On High Speed Trailer

Portable Power Plant

A NEW HEAVY Duty Portable Power Plant, designed especially to meet emergency power needs of telephone companies, public utilities and construction contractors for emergency power and floodlight needs, has been announced by Graybar Electric Co.

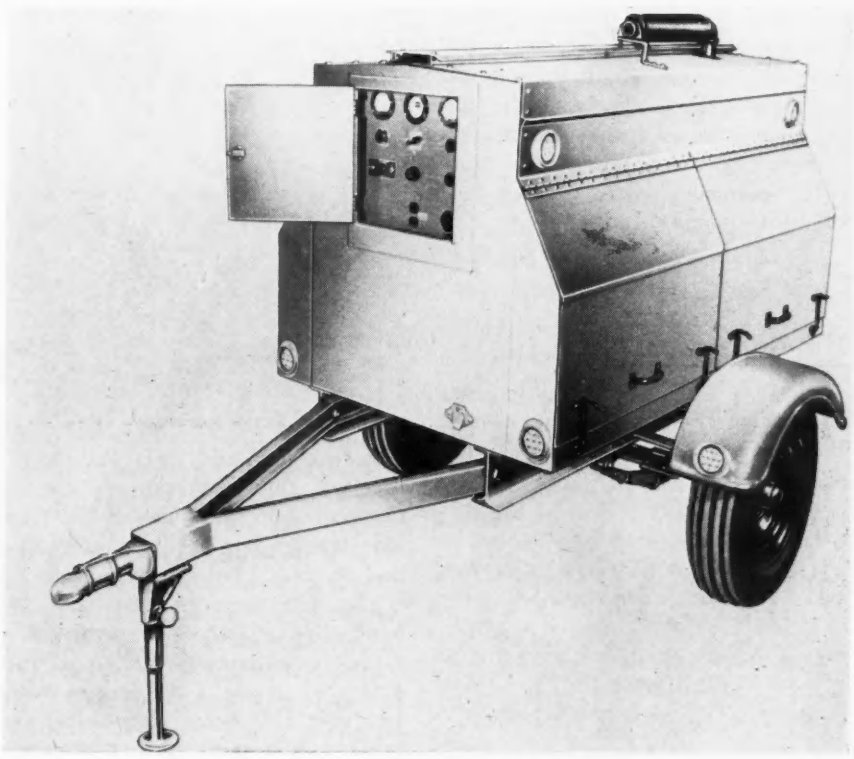
This new Portable Power Plant is mounted on two or four-wheel high speed trailers, in capacities ranging from 10 KW to 100 KW, 110 or 220 Volt single or three phase current.

The revolving field separately excited .8 P. F. generators are designed to supply full rated capacity, powered by liquid cooled gasoline or diesel engines for continuous service with sensitive governor regulations for maintaining generator frequency variations of less than three cycles.

The control panel is equipped with voltmeter, selector switch, ammeter with current transformers and selector switch, frequency meter, manually operated excitor field rheostat, automatic voltage regulator and is arranged with identified receptacles and terminal posts for ease of connecting loads. Polarity plug-in receptacles are provided for 110 volt and 220 volt single phase operation with terminal posts for 220 volt three phase operation. Each receptacle is so arranged it is impossible to insert any plug into the wrong receptacle.

The Unit is mounted on a heavy structural steel chassis with multiple leaf springs, high speed timken bearing wheels, pneumatic tires, dead stick stand, ball type hitch, tail light, side and rear reflectors, license bracket and fenders with fuel tank and sufficient storage space for miscellaneous equipment.

The Unit can be equipped with up to 4 — 80,000 C. P. flood lights adjustable to any position, swinging full 360° horizontally providing brilliant lighting over a wide area.—For complete data, *Check New Product* 192 *on Readers' Service Coupon* (*Page* 70).

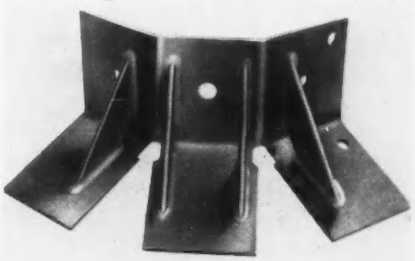


New heavy duty, portable plant.

Pole Bearing Plate

THE A. B. CHANCE CO., Centralia, Mo., is now manufacturing a Pole Bearing Plate.

Used in pairs, at the butt of a pole, Pole Bearing Plates are designed to prevent uplift forces from pulling a single pole out of the ground or upsetting the balance of poles on H-frame transmission lines. Weighing 18 pounds per unit, a pair of Pole Bearing Plates provide a collective 200 square inches of cone-shaped bearing surface.



New Pole bearing plate.

Made of one-quarter-inch mild steel, Chance Pole Bearing Plates are available in either an asphalt-paint or a hot-dip galvanized finish. For complete data, *Check New Product* 193 *on Readers' Service Coupon*, (*Page* 70).

Automatic Hole Digger

THE ROPER Manufacturing Co. has announced production of the Roper Hole Digger, an automatic digging tool that will dig 25 foot holes in six minutes. According to the

manufacturer interchangeable augers from six inches to 24 inches in diameter are available with the Roper Hole Digger which does not need expensive power transmission drives in order to operate.

Tested by contractors since 1952, the Roper Hole Digger will dig a straight or angle hole from any jeep, truck, or tractor equipped with front or rear boom and winch.

In addition to the advantage of not requiring an expensive transmission in order to operate, the Roper Hole Digger does not require one or two men to ride the auger in order for the digger to dig. The weight of the gasoline motor mounted directly above the auger is more than sufficient. Finger tip controls make it easy for one man to operate.

The Roper Hole Digger is ideal for soil testing, guard rail holes, post hole digging, etc. One contractor reports digging 7,000 holes without a minute's time spent at a repair shop.

Another reports that the Roper Hole Digger is ideal for sewage line testing.

One Stow, Ohio contractor reports the Roper Digger the most economical he has ever seen. He reports digging 34 — eight foot holes in approximately three hours.

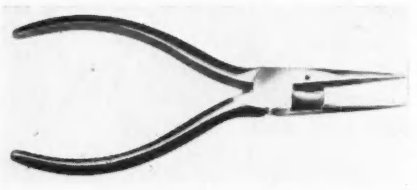
The Roper heavy duty hole digger is compact and easily stored. It comes with standard six foot augers with extensions available up to 25 feet. For further information, *Check New Product* 194 *on Readers' Service Coupon (Page* 70).

New hole digger will dig a straight or angle hole from any jeep or truck.

New Plier Speeds Wiring

MATHIAS KLEIN & SONS has introduced a new long nose plier designed specifically to speed up wiring where the cut, hook and crimp method is employed.

Acting on a shear principle, this plier cuts hard or "dead" soft wire cleanly. The shear blade is removable and may be easily replaced if it becomes worn.



New, long-nose plier.

The reverse side of the plier has a milled section behind the knife so designed that when the wire is cut, it is held in position and a turn of the hand forms a hook in one operation. This is particularly desirable when wiring in resistors. Resistor wires may be cut to length, the hook formed and the hook closed all with the same tool. Furnished standard with self-opening coil spring and 1/16" diameter point. Catalog No. 208-6-NC. *Patent Applied For.*

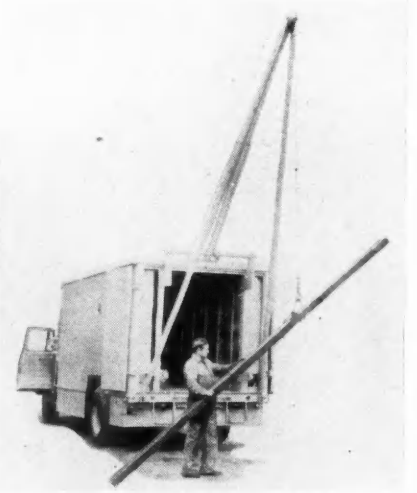
To obtain complete information, *Check New Product* 195.

Mobile Work Shop

CEMCO Industries, Inc., has announced production of the Mobile Work Shop, a truck-mounted shop on wheels.

A feature of this Work Shop is the winch-equipped, five-ton crane which can be completely disassembled and stored inside the truck when the vehicle is in transit.

The truck also has, according to manufacturer's specifications, a 125 cubic feet air compressor, 15 KV generator — 300 ampere, 40 V. welder. The air compressor and the generator-welder are operated by a CEMCO split-shaft power take-off. Compartments and sidewall bins provide ample storage for parts and tools.



New, truck-mounted shop.

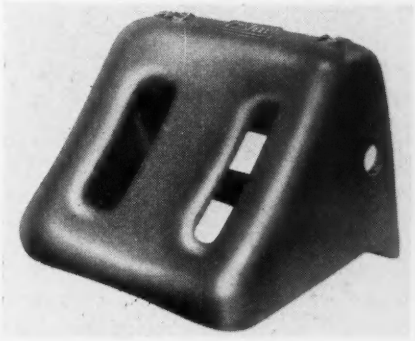
The manufacturer states that this work shop on wheels is particularly useful in bridge and other construction work as well as in general maintenance. Telephone companies and other public utilities find this type of truck-shop especially desirable

for its ability to get from job to job at highway speeds. For complete data, *Check New Product* 196.

New "Jet" Wheel Block

CALUMET Steel Castings Corp. has announced the "Jet" Wheel Block, Model WB17, a small, lightweight, inexpensive, sturdy block made of high strength cast steel.

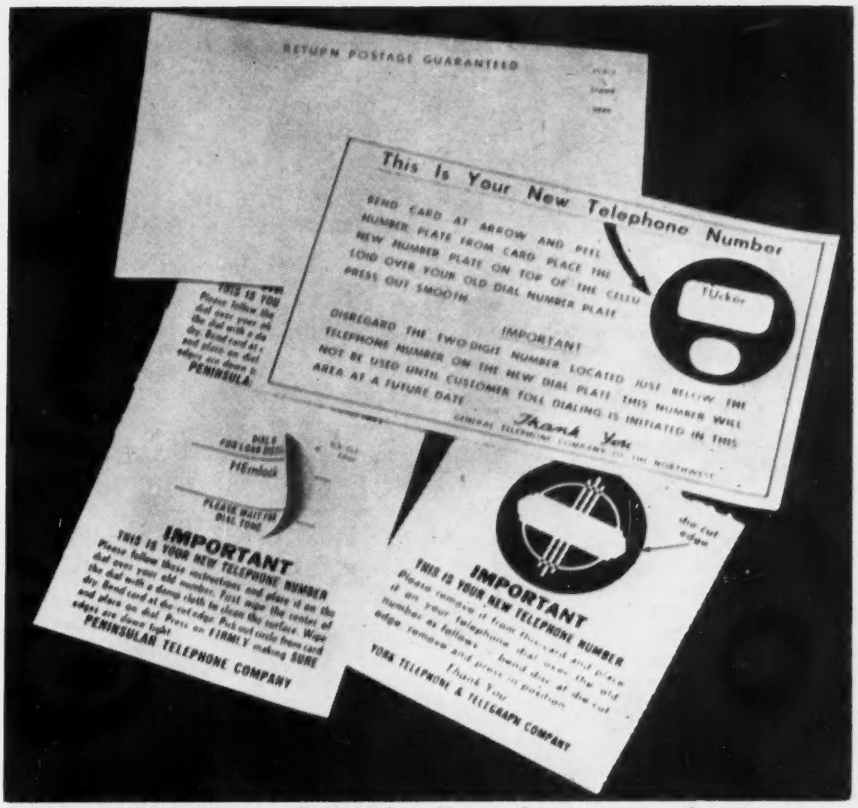
The WB17 Block is well adapted for stake and panel trucks, passenger vehicles, wheel-mounted drills, compressors, generators, welding machines, pumps, etc., where blocking is required on paved surfaces or hard terrain.



New wheel block.

The accurately formed curvatures, molded into the face of the block, give complete tire engagement and afford protection from tire rupture. Excellent pavement gripping characteristics are assured by the calk arrangement. The two outer calks being slightly longer than the intermediate ones so as to provide quick, positive engagement even under light pressure on rather smooth concrete, the middle calks dig in under greater load. Another feature is the relieved calk design which makes the blocks self-sharpening under progressive wear. When necessary, the calks may be repair-welded and reground for repeated use.

The WB17 Block is an integral alloy steel casting with well rounded edges and corners. It weighs 8 lbs., but the proper distribution of the metal in casting insures greatest strength where needed. There is a minimum of actual pavement contact so there is little chance of freeze-up in cold, wet weather, and the block is always easy to remove. Two cast-in side holes are provided for attaching a line or chain to secure the blocks to the vehicle. For complete data, *Check New Product* 197.



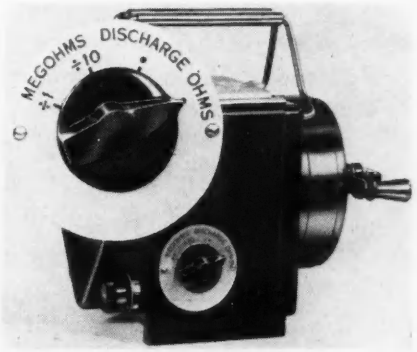
DO IT YOURSELF DIAL STICKERS:—Shown above are examples of pressure-sensitive adhesive dial stickers that are mailed to subscribers whose numbers are being changed. Instructions for removing stickers and applying to telephones are printed on the cards. At top are two sides of a post card type Mail-O-Stix sent to one-instrument subscribers. At bottom are two examples of cards mailed in envelopes to multiple-set customers. These are torn from perforated sheets containing six cards for more speedy handling when numbers are stamped or typed. The *Topflight Corp.* has developed this method and patents have been applied for on the Mail-O-Stix idea.

Insulation Tester

A NEW 4-position switch has been introduced on the Meg type of Megger insulation tester. The hand-operated generator models now provide facilities not formerly available in one instrument.

The A-R-K Switch includes: (A) Megohms ÷ × 1 and ÷ × 10; (R) Ohm scale; and (K) Capacitance discharge switch.

In addition there are Earth, Line and Guard terminals so arranged as to require no change of connections when switching to the ohm scale.



Insulation tester with new four-position switch.

The ratio switch (A switch) divides by 10 the regular megohm scale. Thus, an instrument having a normal range of 0 to 1000 megohms also has, with the ratio switch, a range of 0 to 100 megohms, permitting insulation resistance measurements down as low as 10,000 ohms.

The discharge switch (K switch) permits the discharge of capacitance in the apparatus under test. This charge is built up during the test because the test voltage is d-c.

The Ohm scale (R switch) has a range from 0 to 10,000 ohms. With it tests can be made of conductor resistance without resorting to other test equipment — often of great advantage when trouble shooting in the field. The Ohm scale is used in addition to and independently of the Megohm scale.

This facility for discharging capacitance removes the hazard to per-

ADVERTISING, Directories — *General Telephone Directory Co., 1800 Busse Highway, Des Plaines, Ill.*—[ADV. 1]

BELTS — CLIMBERS — COMPLETE LINEMEN'S EQUIPMENT, *W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.*—[ADV. 2]

BOOTHS—Acoustic Telephones — *Sherron Metallic Corp., 1202 Flushing Ave., Brooklyn 6, N. Y.*—[ADV. 3]

BORING MACHINES, EARTH — *Highway Trailer Co., Edgerton, Wisc.*—[ADV. 4]

CORDS, Switchboard (with or without plugs), Instrument (retractable and regular) and Operators — *Commercial Cord & Supply Co., Inc., 26 Main St., Clifton Springs, N. Y.*—[ADV. 5]

CORDS, Switchboard & Telephone — *Runzel Cord & Wire Co., 4727-31 Montrose Ave., Chicago 41, Ill.*—[ADV. 6]

PIPE PUSHERS — *Giant Manufacturing Co., South 6th St., at 12th Ave., Council Bluffs, Iowa*—[ADV. 7]

POLES, Southern Yellow Pine — *Taylor Colquitt Company, 217 E. Main St., Spartanburgh, S. C.*—[ADV. 8]

POLES, Southern Yellow Pine — *Texas Creosoting Co., Orange, Texas.*—[ADV. 9]

PROTECTIVE EQUIPMENT — *Reliable Electric Company, 3145 Carroll Avenue, Chicago 12, Ill.*—[ADV. 10]

REBUILT TELEPHONES & SWITCHBOARDS — *Tallen Co., Inc., 159 Carlton Ave., Brooklyn 5, N. Y.*—[ADV. 11]

TELEPHONE EQUIPMENT AND SUPPLIES — *Telephone Repair & Supply Company, 1760 Lunt Avenue, Chicago 26, Ill.*—[ADV. 12]

WIRE, Insulated — DATED DROP WIRE — Neoprene or Weatherproof — *Alphaduct Wire & Cable Co., New Brunswick, N. J.*—[ADV. 13]

WIRE, Insulated Drop and Bronze or Copperweld — *Acorn Insulated Wire Co., Inc., 36 Freeman St., Pawtusket, R. I.*—[ADV. 14]

sons and equipment that might come in contact with charged apparatus following the test.

The charge is dissipated in a manner that does no harm to the apparatus or the Megger instrument. The discharge switch opens the circuit between the measuring portion of the instrument and the testing terminals, and short-circuits the latter through a current-limiting resistor.

Full particulars, prices, etc., are described by Bulletin 21-45a-41. For your copy, *Check New Product* 198.

Hydraulic Power Pump

A NEW, PORTABLE high-pressure hydraulic pump, which fills the need for two-speed, fast-approach operation, has been introduced by Greenlee Tool Co., Rockford, Ill.

The new No. 798-AC-SA Power Pump, driven by a ¾ hp, 115-230 volt, electric motor, will handle a wide variety of hydraulic power applications, including Greenlee Benders for pipe and conduit. Under instant finger-tip control at all times, tests show that this pump can operate a hydraulic ram or jack three or five times faster than a hand pump.

This pump, featuring a fast-approach, two-speed action, will, as the ram load increases, automatically change over to high-pressure. Simple, easy operation is the most appreciated

New, portable, high-pressure pump.

feature of this new pump according to contractors who have job-checked it with benders and other hydraulic tools. Three position control — advance, neutral, and return — is provided, with neutral holding the ram pressure and position while the motor is running. Valving provides high-pressure advance only and allows spring action, manual, or gravity return of the ram. Capable of working at a continuous pressure of 6,000 psi, the pump can develop up to 10,000 psi intermittent pressure.—For complete data, *Check New Product* 199.

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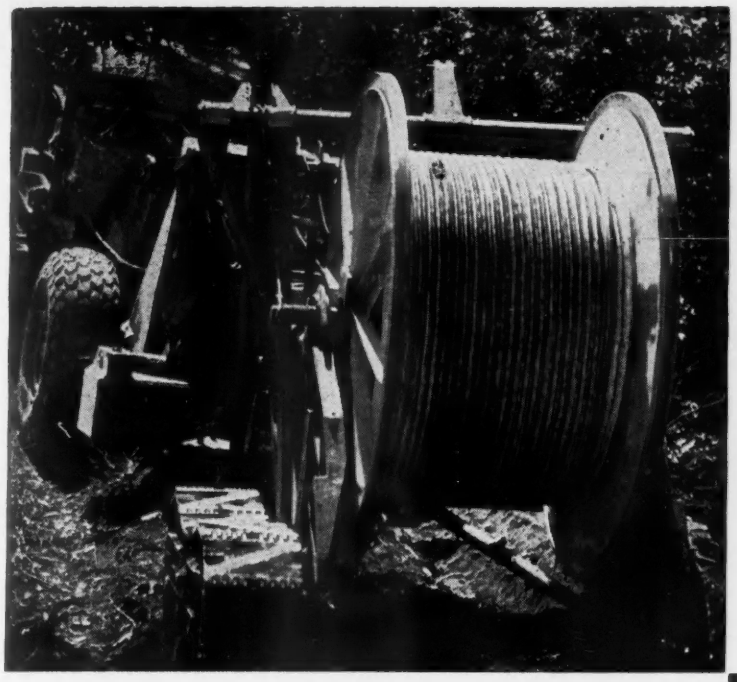
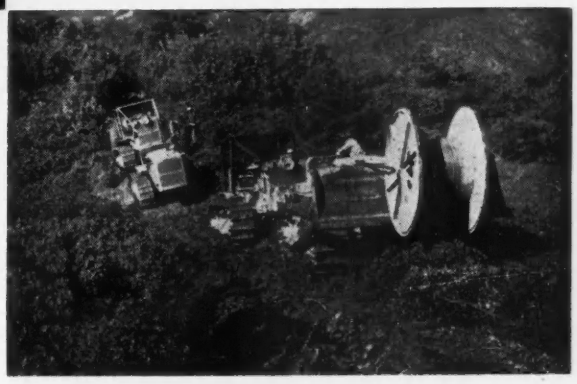


Modern Cable Construction



CHAPTER X-A of Mr. Reed's article discusses: (1) Messenger stringing data for long average spans of telephone cable; and (2) stringing procedures for galvanized steel messenger strand. Chapter X appeared in the July 1 issue.

By JOHN S. REED

Messenger Stringing Data For Long Average Spans Of Telephone Cable

THE USE of short spans for telephone cable results in high construction costs and many companies are now applying long span construction principles to their cables wherever this can be done, as in sparsely settled areas. This practice is considered to be a cost saving advantage where small cables are involved, particularly the plastic jacketed types.

According to R.E.A. experience, savings result from a reduction in the number of poles required to support the cable, in the number of pole attachments needed and the labor of installing the attachments, in the labor required to lash the cable to the messenger, and in pole maintenance. Furthermore, in joint construction projects, the long spans of cable are easily adapted to corresponding long spans of rural power lines.

Long average span construction, as distinguished from special long span construction (with or without catenary strand) requires the use of special strand stringing tension and cable sag data for 6,000-lb. and 10,000-lb. messenger strand.

As previously explained, long average spans of cable require care in planning the lead construction. It is necessary to know at least the initial stringing tension (at 60° F); the tension and sags of the spans, initial at 60° F; and the final unloaded sags at 120° F. The final unloaded sag at 120° F is important in determining the ground clearances that will result at high temperatures.

Comprehensive data on messenger sags and tensions for (1) strand alone; (2) strand with cable in place, initial unloaded; (3) strand and cable with ice and wind load at 0° F, final; (4) cable and strand with ice load and no wind at 32° F, final; and (5) cable and strand no ice and no wind, final, are given in *Tables XXIX* to *XXXVI* for the heavy loading district and *Tables XXXVII* to *XLIV* for the medium loading district. Two messenger sizes, 6,000-lb. and 10,000-lb. are covered in these tables.

The initial and final sags and tensions in these tables, which are reproduced through the courtesy of the Indiana Steel and Wire Company* are specifically determined for plastic jacketed cable lashed to the messenger. For all practical purposes however, the same sags and tensions will apply to lead sheathed cable of the same weight per foot (either lashed or supported by rings). The smaller diameter of the lead covered cable will expose less area for ice and wind loads. If the lead sheathed cable is lashed to the messenger, the sags and tensions with ice and wind plus National Electrical Safety Code constants will be somewhat less than

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**The data in the tables have been prepared to assist engineers in the design and construction of overhead lines. Indiana Steel & Wire Company, Inc. assumes no responsibility or obligation in connection with the use of these data.*

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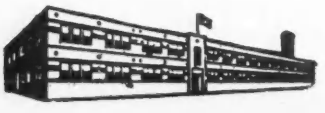

Table XXIX — Sag and Tension Data for 6000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (0.25 lb. per Ft., 0.70 in. dia.) — Heavy Loading District.

Span Length, Ft. →	Temp.	Sag in Inches 175	250	325	Tension in Pounds 175	250	325
(1) Messenger strand only, initial	-30°	6.0	12.3	21.8	1724	1688	1633
	0°	6.7	14.0	24.4	1528	1496	1456
	30°	7.8	16.2	28.0	1316	1299	1274
	60°	9.5	19.0	32.3	1100	1100	1100
	90°	11.5	22.9	37.4	893	921	945
	120°	14.6	27.5	44.0	705	760	813
(2) Messenger strand with cable in place, no ice, no wind, initial	-30°	12.4	24.2	40.3	1821	1865	1904
	0°	13.6	26.6	43.6	1643	1705	1765
	30°	15.2	29.4	47.4	1461	1548	1628
	60°	17.4	32.6	51.5	1283	1398	1497
	90°	19.8	36.2	56.2	1120	1260	1373
	120°	22.9	40.2	61.3	973	1133	1262
(3) Messenger strand and cable with 1/2" ice and 4 lb. wind plus constants, final	0°	37.3	65.9	99.6	2573	2998	3357
(4) Messenger strand and cable with 1/2" ice and no wind, final	32°	32.5	57.8	88.3	1889	2167	2399
(5) Messenger strand with cable in place, no ice, no wind, final	-30°	14.4	30.7	53.8	1556	1481	1435
	0°	16.4	34.2	58.3	1350	1327	1323
	30°	19.1	38.3	63.2	1164	1195	1220
	60°	22.2	42.6	68.4	1004	1073	1131
	90°	25.6	47.0	73.7	870	973	1050
	120°	29.3	51.6	79.0	758	883	978

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shown in the tables. Where the lead sheathed cable is supported by rings, the sags and tensions will be very close to those shown. This is indicated in *Tables XXVII* and *XXVIII* which show the weights per foot of cable and messenger with added ice and wind loads per foot for various sizes

Table XXX — Sag and Tension Data for 6000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (0.50 lb. per ft., 1.00 in. dia.) — Heavy Loading District.

Span Length, Ft. →	Temp.	Sag in Inches 200	250	300	Tension in Pounds 200	250	300
(1) Messenger strand only, initial	-30°	7.8	12.3	18.1	1714	1688	1650
	0°	8.8	14.0	20.5	1517	1496	1468
	30°	10.2	16.2	23.6	1308	1299	1282
	60°	12.2	19.0	27.5	1100	1100	1100
	90°	14.9	22.9	32.3	903	921	937
	120°	18.5	27.5	38.1	720	760	798
(2) Messenger strand with cable in place, no ice, no wind, initial	-30°	22.2	33.2	46.1	1981	2064	2142
	0°	24.1	35.6	49.1	1831	1927	2021
	30°	26.3	38.4	52.2	1682	1793	1896
	60°	28.7	41.4	55.8	1538	1664	1775
	90°	31.5	44.8	59.8	1405	1538	1665
	120°	34.6	48.4	63.9	1280	1425	1560
(3) Messenger strand and cable with 1/2" ice and 4 lb. wind plus constants, final	0°	51.1	72.6	101.4	2963	3269	3546
(4) Messenger strand and cable with 1/2" ice and no wind, final	32°	46.4	66.2	88.7	2274	2493	2689
(5) Messenger strand with cable in place, no ice, no wind, final	-30°	26.8	41.4	59.2	1656	1664	1678
	0°	29.4	44.8	63.1	1507	1538	1577
	30°	32.4	48.4	67.3	1368	1425	1483
	60°	35.5	52.1	71.5	1243	1326	1393
	90°	38.8	56.0	75.6	1138	1234	1314
	120°	42.4	59.9	79.9	1047	1153	1241

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of plastic jacketed and lead sheathed cables on 6,000-lb. (5/16″) and 10,000-lb. (3/8″) messenger strand.

For the tables on average long spans of cables supported on 6,000-lb. and 10,000-lb. messenger in the *heavy loading district*, the maximum loading is ½-inch ice, 4 pounds wind

Table XXXI — Sag and Tension Data for 6000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (0.75 lb. per ft., 1.20 in. dia.) — Heavy Loading District.

Span Length, Ft. →	Temp.	Sag in Inches			Tension in Pounds		
		150	200	250	150	200	250
(1) Messenger strand only, initial	-30°	4.4	7.8	12.3	1737	1714	1688
	0°	4.9	8.8	14.0	1538	1517	1496
	30°	5.5	10.2	16.2	1321	1308	1299
	60°	6.9	12.2	19.0	1100	1100	1100
	90°	8.6	14.9	22.9	883	903	921
	120°	11.0	18.5	27.5	681	720	760
(2) Messenger strand with cable in place, no ice, no wind, initial	-30°	16.3	27.6	40.8	2012	2141	2263
	0°	17.6	29.4	43.0	1861	2005	2145
	30°	19.3	31.7	45.6	1708	1871	2026
	60°	21.1	34.1	48.5	1564	1742	1910
	90°	23.3	36.7	51.6	1425	1621	1790
	120°	25.6	39.4	54.8	1300	1509	1693
(3) Messenger strand and cable with 1/2" ice and 4 lb. wind plus constants, final	0°	35.2	52.7	78.0	2779	3040	3488
(4) Messenger strand and cable with 1/2" ice and no wind, final	32°	32.6	50.5	72.6	2211	2534	2751
(5) Messenger strand with cable in place, no ice, no wind, final	-30°	18.8	32.0	50.0	1762	1852	1850
	0°	20.8	34.4	53.2	1600	1718	1747
	30°	22.9	37.3	56.4	1447	1592	1647
	60°	25.3	40.2	59.8	1311	1478	1554
	90°	27.8	43.3	63.2	1195	1378	1466
	120°	30.5	46.3	66.8	1094	1283	1388

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Table XXXII Sag and Tension Data for 6000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (1.00 lb. per ft., 1.40 in. dia.) Heavy Loading District.

Span Length, Ft. →	Temp.	Sag in Inches			Tension in Pounds		
		150	200	250	150	200	250
(1) Messenger strand only, initial	-30°	4.4	7.8	12.3	1737	1714	1688
	0°	4.9	8.8	14.0	1538	1517	1496
	30°	5.5	10.2	16.2	1321	1308	1299
	60°	6.9	12.2	19.0	1100	1100	1100
	90°	8.6	14.9	22.9	883	903	921
	120°	11.0	18.5	27.5	681	720	760
(2) Messenger strand with cable in place, no ice, no wind, initial	-30°	19.4	32.3	47.0	2136	2305	2462
	0°	20.9	34.1	49.2	1995	2180	2354
	30°	22.6	36.1	51.7	1853	2058	2248
	60°	24.4	38.4	54.4	1721	1938	2142
	90°	26.2	40.8	57.1	1594	1820	2035
	120°	28.3	43.3	60.1	1476	1714	1934
(3) Messenger strand and cable with 1/2" ice and 4 lb. wind plus constants, final	0°	37.4	58.7	83.2	2936	3341	3692
(4) Messenger strand and cable with 1/2" ice and no wind, final	32°	35.2	55.3	78.7	2394	2710	2991
(5) Messenger strand with cable in place, no ice, no wind, final	-30°	22.2	38.0	57.1	1876	1953	2033
	0°	24.2	40.3	60.0	1727	1835	1933
	30°	26.3	42.8	63.0	1590	1724	1842
	60°	28.4	45.7	66.1	1469	1623	1754
	90°	30.8	48.6	69.5	1360	1530	1675
	120°	33.1	51.5	73.0	1262	1445	1600

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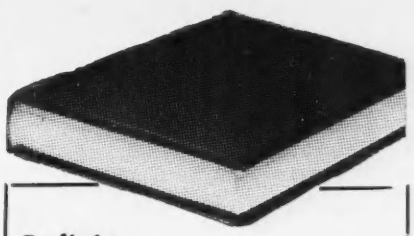

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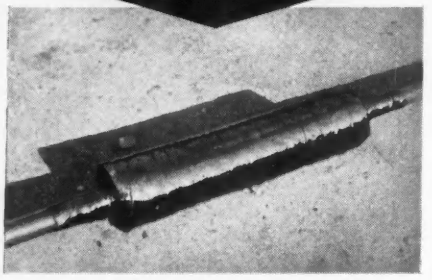

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load per square foot, plus constants 0.29 for messenger strand and 0.31 for cable, added to the resultant loading as specified by the National Electrical Safety Code. The messenger strand and cable are considered to be touching each other and encircled

Table XXXIII Sag and Tension Data for 6000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (1.25 lb. per ft., 1.60 in. dia.) — Heavy Loading District.

Span Length, Ft. →	Temp.	Sag in Inches 100	150	200	Tension in Pounds 100	150	200
(1) Messenger strand only, initial	-30°	1.9	4.4	7.8	1757	1737	1714
	0°	2.0	4.9	8.8	1551	1538	1517
	30°	2.4	5.5	10.2	1329	1321	1308
	60°	3.0	6.9	12.2	1100	1100	1100
	90°	3.8	8.6	14.9	870	883	903
	120°	5.3	11.0	18.5	642	681	720
(2) Messenger strand with cable in place, no ice, no wind, initial	-30°	10.9	22.6	36.5	2041	2252	2456
	0°	11.6	23.8	38.1	1889	2123	2343
	30°	12.8	25.3	40.1	1739	1994	2231
	60°	14.0	26.9	42.2	1592	1868	2122
	90°	15.5	28.8	44.4	1450	1742	2014
	120°	17.0	31.0	46.7	1319	1633	1909
(3) Messenger strand and cable with 1/2" ice and 4 lb. wind plus constants, final	0°	21.1	39.7	62.4	2588	3091	3515
(4) Messenger strand and cable with 1/2" ice and no wind, final	32°	20.2	36.2	59.4	2145	2559	2908
(5) Messenger strand with cable in place, no ice, no wind, final	-30°	11.9	25.4	42.8	1868	1979	2090
	0°	13.3	27.2	45.1	1696	1840	1979
	30°	14.6	29.4	47.5	1535	1713	1878
	60°	16.2	31.4	50.2	1389	1602	1788
	90°	17.8	33.6	52.8	1254	1500	1698
	120°	19.4	35.6	55.7	1145	1409	1616

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Table XXXIV — Sag and Tension Data for 10,000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (0.50 lb. per ft., 1.00 in. dia.) Heavy Loading District.

Span Length, Ft. →	Temp.	Sag in Inches 300	400	500	600	Tension in Pounds 300	400	500	600
(1) Messenger strand only, initial	-30°	12.7	22.7	36.2	53.0	2915	2877	2830	2778
	0°	13.8	24.8	39.5	57.7	2658	2624	2591	2551
	30°	15.4	27.7	43.7	63.0	2377	2360	2341	2322
	60°	17.5	31.2	48.7	69.9	2100	2100	2100	2100
	90°	20.2	35.4	54.8	78.1	1821	1839	1863	1888
	120°	23.9	41.3	62.0	87.0	1544	1589	1645	1693
(2) Messenger strand with cable in place, no ice, no wind, initial	-30°	32.5	55.6	83.0	115.0	3244	3390	3533	3683
	0°	34.9	58.6	86.9	119.9	3032	3206	3367	3531
	30°	37.7	62.5	91.6	125.5	2813	3012	3204	3379
	60°	40.7	66.5	96.7	131.2	2605	2822	3036	3232
	90°	44.2	71.3	102.5	137.6	2399	2644	2874	3082
	120°	48.1	76.4	108.5	144.6	2201	2468	2719	2939
(3) Messenger strand and cable with 1/2" ice and 4 lb. wind plus constants, final	0°	76.7	121.1	171.8	229.0	4550	5144	5669	6146
(4) Messenger strand and cable with 1/2" ice and no wind, final	32°	68.2	108.1	155.0	207.8	3610	4042	4420	4752
(5) Messenger strand with cable in place, no ice, no wind, final	-30°	36.8	65.3	101.3	143.8	2860	2876	2908	2955
	0°	40.3	69.7	106.6	150.1	2636	2692	2761	2832
	30°	43.9	74.6	112.6	156.6	2417	2522	2619	2710
	60°	47.8	79.9	118.7	163.7	2219	2359	2486	2593
	90°	52.1	85.4	125.2	170.9	2031	2207	2359	2486
	120°	56.9	91.5	131.8	178.4	1864	2070	2241	2383

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by a band of ice ½-inch thick.

For the tables on average long spans of cables supported on 6,000-lb. and 10,000-lb. messenger in the *medium loading district,* the same information applies, except that the maximum ice thickness is ¼ inch and the N.E.S.C. constants are 0.19

Table XXXV — Sag and Tension Data for 10,000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (0.75 lb. per ft., 1.20 in. dia.) Heavy Loading District.

Span Length, Ft. →	Temp	Sag in Inches				Tension in Pounds			
		300	400	500	600	300	400	500	600
(1) Messenger strand only, initial	-30°	12.7	22.7	36.2	53.0	2915	2877	2830	2778
	0°	13.8	24.8	39.5	57.7	2658	2624	2591	2551
	30°	15.4	27.7	43.7	63.0	2377	2360	2341	2322
	60°	17.5	31.2	48.7	69.9	2100	2100	2100	2100
	90°	20.2	35.4	54.8	78.1	1821	1839	1863	1888
	120°	23.9	41.3	62.0	87.0	1544	1589	1645	1693
(2) Messenger strand with cable in place, no ice, no wind, initial	-30°	41.9	67.7	99.7	136.1	3442	3670	3891	4115
	0°	43.0	70.9	103.8	140.6	3254	3507	3745	3978
	30°	45.7	74.4	108.1	145.8	3058	3337	3596	3840
	60°	48.6	78.5	112.6	151.2	2866	3171	3448	3707
	90°	52.0	82.7	117.7	156.7	2682	3008	3301	3571
	120°	55.8	87.4	123.1	163.1	2502	2850	3163	3440
(3) Messenger strand and cable with 1/2" ice and 4 lb. wind plus constants, final	0°	82.7	130.1	184.6	245.0	4821	5471	6041	6551
(4) Messenger strand and cable with 1/2" ice and no wind, final	32°	75.4	119.2	170.0	227.3	3929	4422	4847	5237
(5) Messenger strand with cable in place, no ice, no wind, final	-30°	46.1	79.1	120.1	168.0	3042	3139	3242	3341
	0°	49.1	83.3	125.2	173.9	2844	2981	3111	3232
	30°	52.7	88.1	130.6	180.1	2652	2828	2981	3121
	60°	56.5	92.9	136.2	186.4	2478	2682	2856	3012
	90°	60.5	97.7	142.1	192.8	2310	2547	2739	2913
	120°	64.7	103.1	148.3	199.7	2157	2415	2626	2814

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Table XXXVI — Sag and Tension Data for 10,000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (1.00 lb. per ft., 1.40 in. dia.) Heavy Loading District.

Span Length, Ft. →	Temp.	Sag in Inches				Tension in Pounds			
		300	400	500	600	300	400	500	600
(1) Messenger strand only, initial	-30°	12.7	22.7	36.2	53.0	2915	2877	2830	2778
	0°	13.8	24.8	39.5	57.7	2658	2624	2591	2551
	30°	15.4	27.7	43.7	63.0	2377	2360	2341	2322
	60°	17.5	31.2	48.7	69.9	2100	2100	2100	2100
	90°	20.2	35.4	54.8	78.1	1821	1839	1863	1888
	120°	23.9	41.3	62.0	87.0	1544	1589	1645	1693
(2) Messenger strand with cable in place, no ice, no wind, initial	-30°	47.4	78.1	113.6	154.2	3642	3947	4238	4513
	0°	50.0	81.1	117.6	158.4	3472	3794	4105	4392
	30°	52.6	84.7	121.7	163.2	3297	3642	3964	4267
	60°	55.6	88.3	126.1	168.0	3125	3491	3828	4143
	90°	58.7	92.3	130.8	173.4	2955	3341	3691	4014
	120°	62.3	96.6	135.8	178.8	2785	3196	3559	3891
(3) Messenger strand and cable with 1/2" ice and 4 lb. wind plus constants, final	0°	88.1	138.6	196.3	260.4	5091	5779	6389	6935
(4) Messenger strand and cable with 1/2" ice and no wind, final	32°	81.8	129.2	183.8	245.4	4228	4774	5253	5673
(5) Messenger strand with cable in place, no ice, no wind,	-30°	53.8	91.1	136.4	189.0	3234	3390	3543	3681
	0°	56.8	95.2	141.1	194.4	3052	3248	3428	3582
	30°	60.1	99.5	146.2	200.4	2880	3107	3309	3478
	60°	63.8	103.8	151.4	206.4	2721	2971	3195	3383
	90°	67.8	108.6	157.0	212.4	2569	2842	3084	3288
	120°	71.8	113.5	162.7	219.0	2425	2719	2981	3193

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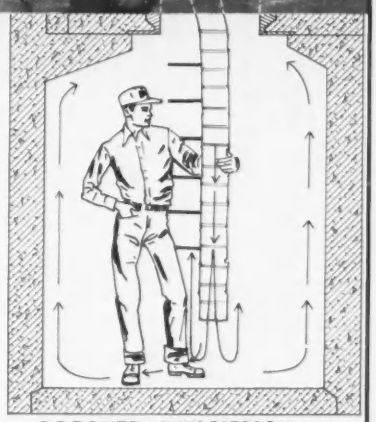

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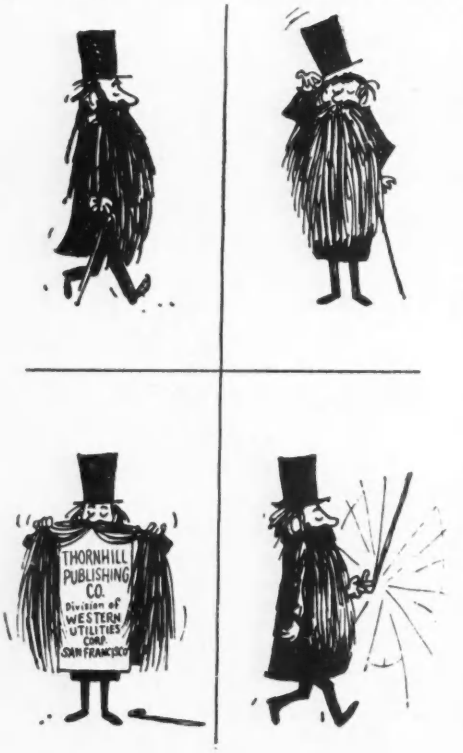

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for messenger strand and 0.22 for cable.

Stringing Procedures for Galvanized Steel Strand

The stringing of messenger strand is a simple operation compared to the more elaborate procedure involved in placing the cable on the messenger. Nevertheless, the stringing operation may be hazard-

Table XXXVII — Sag and Tension Data for 6000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (0.25 lb. per ft., 0.70 in. dia.) Medium Loading District.

Span Length, Ft. →	Temp.	Sag in Inches 200	300	400	Tension in Pounds 200	300	400
(1) Messenger strand only, initial	0°	8.8	20.5	37.9	1517	1468	1412
	15°	9.4	21.9	40.5	1413	1374	1329
	30°	10.2	23.6	43.0	1308	1282	1251
	60°	12.2	27.5	48.8	1100	1100	1100
	90°	14.9	32.3	55.6	903	937	971
	120°	18.5	38.1	63.1	720	798	857
(2) Messenger strand with cable in place, no ice, no wind, initial	0°	17.4	37.9	64.0	1659	1744	1827
	15°	18.5	39.2	66.1	1569	1674	1765
	30°	19.6	41.2	68.5	1489	1602	1703
	60°	22.2	44.9	73.4	1321	1463	1589
	90°	25.2	49.3	79.0	1164	1337	1479
	120°	28.7	54.0	84.8	1025	1220	1378
(3) Messenger strand and cable with 1/4" ice and 4 lb. wind plus constants, final	15°	37.4	72.1	113.0	2219	2612	2945
(4) Messenger strand and cable with 1/4" ice and no wind, final	32°	29.3	60.1	96.7	1649	1873	2064
(5) Messenger strand with cable in place, no ice, no wind, final	0°	19.3	43.0	74.2	1509	1533	1571
	15°	20.9	45.1	77.2	1409	1458	1515
	30°	22.4	47.3	79.9	1316	1391	1461
	60°	25.6	52.1	85.8	1146	1264	1363
	90°	29.4	57.1	91.8	1001	1153	1274
	120°	33.4	62.3	98.2	882	1056	1192

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Table XXXVIII — Sag and Tension Data for 6000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (0.50 lb. per ft., 1.00 in. dia.) Medium Loading District.

Span Length, Ft. →	Temp.	Sag in Inches 200	300	400	Tension in Pounds 200	300	400
(1) Messenger strand only, initial	0°	8.8	20.5	37.9	1517	1468	1412
	15°	9.4	21.9	40.5	1413	1374	1329
	30°	10.2	23.6	43.0	1308	1282	1251
	60°	12.2	27.5	48.8	1100	1100	1100
	90°	14.9	32.3	55.6	903	937	971
	120°	18.5	38.1	63.1	720	798	857
(2) Messenger strand with cable in place, no ice, no wind, initial	0°	24.1	49.1	80.8	1831	2021	2191
	15°	25.2	50.9	82.8	1757	1959	2139
	30°	26.3	52.2	85.0	1682	1896	2087
	60°	28.7	55.8	89.2	1538	1 75	1984
	90°	31.5	59.8	94.0	1405	1 65	1884
	120°	34.6	63.9	98.9	1280	1560	1789
(3) Messenger strand and cable with 1/4" ice and 4 lb. wind plus constants, final	15°	42.4	80.5	126.4	2447	2913	3301
(4) Messenger strand and cable with 1/4" ice and no wind, final	32°	36.7	71.2	113.2	1907	2222	2487
(5) Messenger strand with cable in place, no ice, no wind, final	0°	26.4	55.4	92.6	1675	1796	1914
	15°	27.7	57.4	94.9	1592	1736	1863
	30°	29.3	59.5	97.4	1512	1677	1817
	60°	32.3	63.8	102.4	1370	1567	1727
	90°	35.5	68.2	107.6	1241	1469	1644
	120°	39.1	72.6	113.2	1133	1373	1566

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ous under certain circumstances. For example, if the lead is in joint construction with or crosses under a power line, workmen may be exposed to dangerous shock hazards.

The simplest protective measure in such cases is to bond the messenger to an existing cable and messenger that has an unbroken connection (no insulating joints) to a low resistance ground at the central office. If this central office ground is not available, connection may be made to a vertical grounding conductor of a multi-grounded neutral power system.

This connection should be made within the telephone facility space, never inside the area occupied by the power facilities, using No. 6 insulated copper bond wire. Some power companies may object to a telephone company employe making this connection to their grounding conductors, so the power company should be contacted for the permission.

When the telephone company employe is to bond the messenger to the power grounding conductor, it is advisable for him to wear rubber gloves and test the connection by touching the bond wire from the messenger to the grounding conductor. This will make sure there are no dangerous potentials on this conductor as indicated by sparking or arcing on repeated contacts.

A further precaution is to hold down the messenger with dry handlines along the joint use lead or at crossings under power lines.

Whenever this is feasible, as much of the messenger strand as possible should be placed in one pulling operation to minimize frequent splicing of the strand and save time and labor involved in moving the pulling equipment. The length of each stringing section is governed by the number of corners in the lead, the angle or pull at each corner, the number of grade changes involving up and down pulls of the messenger, and the presence of interfering objects such as trees.

The messenger strand may be unreeled from a stationary or moving reel, depending on circumstances in the stringing area and the telephone company's preference. The stationary reel may be mounted on a pay out reel stand or reel jacks, or even a cable reel trailer chocked in position. When the reel is to be transported to pay out the strand, a cable reel trailer or reel bar on rear support brackets of the truck may be employed.

When the strand is pulled off a stationary reel, it may be passed through the grooves of the suspension clamps which have been tightened just sufficiently to reduce the friction on the moving strand to a minimum and at the same time keep it from coming out in the pulling operation.

Alternatively, the strand may be

Table XXXIX — Sag and Tension Data for 6000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (0.75 lb. per ft., 1.20 in. dia.) Medium Loading District.

Span Length, Ft. →	Temp.	Sag in Inches			Tension in Pounds		
		250	300	350	250	300	350
(1) Messenger strand only, initial	0°	14.0	20.5	28.8	1499	1468	1437
	15°	14.9	21.9	30.5	1398	1374	1350
	30°	16.2	23.6	32.6	1300	1282	1262
	60°	19.0	27.5	37.4	1100	1100	1100
	90°	22.9	32.3	43.3	921	937	952
	120°	27.5	38.1	49.9	762	798	826
(2) Messenger strand with cable in place, no ice, no wind, initial	0°	43.0	58.3	75.7	2145	2279	2405
	15°	44.2	59.9	77.3	2087	2227	2354
	30°	45.6	61.3	78.8	2026	2170	2302
	60°	48.5	64.7	82.3	1910	2064	2201
	90°	51.6	68.2	86.4	1800	1963	2103
	120°	54.8	71.8	90.4	1693	1861	2010
(3) Messenger strand and cable with 1/4" ice and 4 lb. wind plus constants, final	15°	65.8	87.5	111.4	2913	3158	3385
(4) Messenger strand and cable with 1/4" ice and no wind, final	32°	59.5	79.4	102.0	2332	2514	2678
(5) Messenger strand with cable in place, no ice, no wind,	0°	47.3	65.2	85.1	1953	2051	2136
	15°	49.1	67.0	87.1	1892	1995	2085
	30°	50.6	68.9	89.2	1835	1943	2036
	60°	54.1	72.6	93.4	1721	1840	1946
	90°	57.5	76.6	97.8	1610	1744	1856
	120°	61.1	80.6	102.4	1512	1656	1776

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Table XL — Sag and Tension Data for 6000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (1.00 lb. per ft., 1.40 in. dia.) Medium Loading District.

Span Length, Ft. →	Temp.	Sag in Inches			Tension in Pounds		
		200	250	300	200	250	300
(1) Messenger strand only, initial	0°	8.8	14.0	20.5	1517	1496	1468
	15°	9.4	14.9	21.9	1413	1396	1374
	30°	10.2	16.2	23.6	1308	1299	1282
	60°	12.2	19.0	27.5	1100	1100	1100
	90°	14.9	22.9	32.3	903	921	937
	120°	18.5	27.5	38.1	720	760	798
(2) Messenger strand with cable in place, no ice, no wind, initial	0°	34.1	49.2	66.5	2180	2354	2521
	15°	35.0	50.5	67.8	2118	2299	2472
	30°	36.1	51.7	69.1	2058	2248	2421
	60°	38.4	54.4	72.2	1938	2142	2327
	90°	40.8	57.1	75.2	1820	2035	2229
	120°	43.3	60.1	78.7	1714	1934	2134
(3) Messenger strand and cable with 1/4" ice and 4 lb. wind plus constants, final	15°	50.0	71.3	94.2	2821	3119	3386
(4) Messenger strand and cable with 1/4" ice and no wind, final	32°	46.1	65.8	87.5	2335	2572	2776
(5) Messenger strand with cable in place, no ice, no wind, final	0°	37.0	54.1	73.8	2012	2150	2276
	15°	38.2	55.7	75.5	1946	2096	2224
	30°	39.5	57.2	77.3	1881	2038	2175
	60°	42.1	60.2	80.8	1763	1933	2078
	90°	45.0	63.6	84.4	1654	1835	1987
	120°	47.8	67.0	88.3	1554	1744	1905

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passed over and behind the suspension clamp where the latter is spaced out from the pole with a nut or in drive hooks temporarily driven in the poles. The last method should be employed only in situations where the permanent location for the strand cannot be determined beforehand. In this case, the drive hooks are located to place the messenger at a temporary height on the poles until the messenger can be tensioned to the desired extent and then moved to the final location of the suspension clamps.

Table XLI — Sag and Tension Data for 6000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (1.25 per ft., 1.60 in. dia.) Medium Loading District.

Span Length, Ft. →	Temp.	Sag in Inches			Tension in Pounds		
		200	250	300	200	250	300
(1) Messenger strand only, initial	0°	8.8	14.0	20.5	1517	1496	1468
	15°	9.4	14.9	21.9	1413	1396	1374
	30°	10.2	16.2	23.6	1308	1299	1282
	60°	12.2	19.0	27.5	1100	1100	1100
	90°	14.9	22.9	32.3	903	921	937
	120°	18.5	27.5	38.1	720	760	798
(2) Messenger strand with cable in place, no ice, no wind, initial	0°	38.1	54.5	73.4	2343	2559	2750
	15°	38.9	55.7	74.8	2286	2505	2702
	30°	40.1	56.9	76.1	2231	2454	2656
	60°	42.2	59.3	78.7	2122	2354	2563
	90°	44.4	62.2	81.7	2014	2256	2470
	120°	46.7	65.0	84.7	1909	2162	2379
(3) Messenger strand and cable with 1/4" ice and 4 lb. wind plus constants, final	15°	53.4	75.7	100.3	2998	3311	3600
(4) Messenger strand and cable with 1/4" ice and no wind, final	32°	49.9	70.9	94.3	2531	2795	3014
(5) Messenger strand with cable in place, no ice, no wind, final	0°	41.2	59.8	81.5	2168	2338	2477
	15°	42.4	61.4	83.0	2110	2284	2428
	30°	43.6	62.9	84.6	2047	2232	2382
	60°	46.0	65.8	88.0	1935	2134	2294
	90°	48.6	68.9	91.3	1830	2039	2207
	120°	51.4	72.1	94.9	1731	1951	2123

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Table XLII — Sag and Tension Data for 10,000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (0.50 lb. per ft., 1.03 in. dia.) Medium Loading District.

Span Length, Ft. →	Temp.	Sag in Inches				Tension in Pounds			
		400	500	600	700	400	500	600	700
(1) Messenger strand only, initial	0°	24.8	39.5	57.7	80.0	2624	2591	2551	2512
	15°	26.3	41.5	60.5	83.4	2493	2466	2437	2408
	30°	27.7	43.7	63.0	87.4	2360	2341	2322	2300
	60°	31.2	48.7	69.9	95.8	2100	2100	2100	2100
	90°	35.4	54.8	78.1	105.2	1839	1863	1888	1912
	120°	41.3	62.0	87.0	115.8	1589	1645	1693	1738
(2) Messenger strand with cable in place, no ice, no wind, initial	0°	58.8	86.9	120.1	156.6	3206	3369	3531	3683
	15°	60.2	89.3	122.6	159.6	3109	3286	3456	3616
	30°	62.4	91.6	125.4	162.6	3012	3204	3379	3547
	60°	66.6	96.8	131.2	169.2	2822	3038	3232	3408
	90°	71.3	102.4	137.6	176.4	2644	2876	3084	3276
	120°	76.4	108.6	144.7	184.2	2468	2718	2937	3139
(3) Messenger strand and cable with 1/4" ice and 4 lb. wind plus constants, final	15°	99.8	142.7	190.6	242.4	4283	4695	5075	5427
(4) Messenger strand and cable with 1/4" ice and no wind, final	32°	86.0	124.0	167.3	215.4	3422	3701	3959	4200
(5) Messenger strand with cable in place, no ice, no wind, final	0°	63.6	95.6	133.2	175.2	2961	3072	3181	3293
	15°	65.8	98.5	136.3	178.8	2854	2983	3105	3230
	30°	68.2	101.5	139.9	183.0	2759	2898	3036	3159
	60°	73.2	107.6	146.8	190.8	2573	2737	2898	3036
	90°	78.7	113.9	154.0	198.0	2401	2587	2759	2915
	120°	81.4	120.6	161.4	207.6	2237	2446	2626	2797

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In some cases, the messenger strand may be dragged out along the lead from the stationary reel. This procedure is not recommended where long pulls are involved, since it may result in damage to the galvanizing on the strand.

Where trees are present along the lead, it may be necessary to thread the pulling line through the branches, using a handline thrown over the limbs or passed over them with a wire raising tool. It may be found necessary to use pull-offs to avoid contact of the messenger (and later the cable) with tree limbs.

At low points in a joint-use lead, where there is danger of the messenger coming in contact with the power wires in the stringing operation, a snatch block should be attached to the pole for holding down the pulling line and the messenger.

The use of a moving reel for placing messenger strand is generally the most satisfactory method, though it requires special precautions to be taken when traffic is heavy. This method works best when the right of way is free from obstructions such as trees. It requires that the strand be attached on the road side of the poles.

The procedure generally is as follows:

At the start of the pulling section the messenger is either fastened temporarily to the base of the pole, or in the permanent attachment at the regular height on the pole. (In either case, a protective bond is placed to assure a low-resistance ground connection for the strand where a joint-use lead or crossing under a power line is involved.) Since fastening the messenger to a permanent attachment will cause the strand to whip up high should it snag on an obstruction, the strand should be held down at the base of the next pole, particularly when the lead is in joint construction.

As the trailer or truck with the strand reel travels down the road, the strand is payed out onto the ground. It is desirable to provide a reel brake, which will keep the reel from overrunning when the truck stops. Otherwise, it will be necessary to station a man on the trailer or

truck to stop the rotation of the reel as required.

The men follow the truck at a safe distance and raise the strand to the suspension clamps with handlines, fastening the strand in the clamps with only enough tension to prevent it from coming out and yet not to bind the strand when it moves in the tensioning operation.

At rises in the lead or at corners where the strand would pull away from the pole, the messenger should be fastened to the base of the pole. When the men arrive at this pole to raise the strand, the pulling operation should be stopped until the strand is placed in the suspension clamps. If this is not done, the men will not be able to handle the messenger because of the tension on it.

At road crossings or intersections and at driveways, the messenger strand should be raised to the suspension clamps as soon as possible and fastened in place to keep the road span from sagging down. At such crossing points, the truck should stop before crossing the road to enable the strand to be completely raised and tensioned in place. The truck then proceeds across the road, the cross traffic being halted from both directions during this time and while the crossing messenger span is being raised and fastened in place.

When messenger strand is pulled out along a lead in joint construction, there is danger that the strand may catch on an obstruction and whip up into the power wires. If the strand is properly grounded as previously explained, this will minimize the shock hazard to the men. However, it is a recognized safety practice that all men handling messenger strand in the pulling operation should wear rubber gloves.

The messenger strand should be payed out on the ground in about one-quarter mile lengths, when the truck is stopped to enable the strand to be raised to the suspension clamps where it is fastened only tightly enough to prevent binding during the tensioning operation. The strand may then be pulled up to part of its final tension to reduce sags and prevent possible whipping of the strand into contact with power wires until completion of the entire pulling operation. (*To Be Continued.*)

Table XLIII — Sag and Tension Data for 10,000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (0.75 lb. per ft., 1.20 in. dia.) Medium Loading District.

Span Length, Ft. →	Temp.	Sag in Inches				Tension in Pounds			
		400	500	600	700	400	500	600	700
(1) Messenger strand only, initial	0°	24.8	39.5	57.7	80.0	2624	2591	2551	2512
	15°	26.3	41.5	60.5	83.4	2493	2466	2437	2408
	30°	27.7	43.7	63.0	87.4	2360	2341	2322	2300
	60°	31.2	48.7	69.9	95.8	2100	2100	2100	2100
	90°	35.4	54.8	78.1	105.2	1839	1863	1888	1912
	120°	41.3	62.0	87.0	115.8	1589	1645	1693	1738
(2) Messenger strand with cable in place, no ice, no wind, initial	0°	70.8	103.6	140.6	181.8	3505	3745	3978	4194
	15°	72.7	105.7	143.3	184.8	3422	3670	3911	4131
	30°	74.4	107.8	145.8	187.8	3335	3596	3842	4065
	60°	78.4	112.6	151.2	193.8	3171	3450	3707	3943
	90°	82.7	117.7	156.7	199.8	3008	3305	3571	3814
	120°	87.2	123.0	163.0	207.0	2850	3161	3440	3689
(3) Messenger strand and cable with 1/4" ice and 4 lb. wind plus constants, final	15°	109.1	155.2	206.6	263.4	4604	5069	5494	5876
(4) Messenger strand and cable with 1/4" ice and no wind, final	32°	97.3	139.4	187.1	240.0	3788	4129	4443	4721
(5) Messenger strand with cable in place, no ice, no wind, final	0°	76.4	113.0	155.0	202.8	3248	3436	3608	3759
	15°	78.6	115.8	158.4	206.4	3161	3359	3541	3695
	30°	80.8	118.4	161.3	210.6	3074	3284	3476	3638
	60°	85.7	124.0	168.1	217.2	2904	3139	3345	3521
	90°	90.6	129.8	174.7	224.4	2745	2997	3216	3408
	120°	95.8	136.0	181.6	232.2	2599	2862	3096	3293

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Table XLIV — Sag and Tension Data for 10,000-lb. Specification Grade Galvanized Steel Messenger Strand with Plastic-Sheath Telephone Cable (1.00 lb. per ft., 1.40 in. dia.) Medium Loading District.

Span Length, Ft. →	Temp.	Sag in Inches				Tension in Pounds			
		400	500	600	700	400	500	600	700
(1) Messenger strand only, initial	0°	24.8	39.5	57.7	80.0	2624	2591	2551	2512
	15°	26.3	41.5	60.5	83.4	2493	2466	2437	2408
	30°	27.7	43.7	63.0	87.4	2360	2341	2322	2300
	60°	31.2	48.7	69.9	95.8	2100	2100	2100	2100
	90°	35.4	54.8	78.1	105.2	1839	1863	1888	1912
	120°	41.3	62.0	87.0	115.8	1589	1645	1693	1738
(2) Messenger strand with cable in place, no ice, no wind, initial	0°	81.1	117.6	158.4	204.0	3794	4105	4394	4657
	15°	83.0	119.5	160.8	206.4	3717	4036	4329	4596
	30°	84.7	121.7	163.2	209.4	3642	3964	4267	4540
	60°	88.3	126.1	168.0	214.8	3491	3828	4143	4424
	90°	92.3	130.8	173.4	220.8	3341	3691	4014	4311
	120°	96.6	135.8	178.8	226.8	3196	3559	3891	4192
(3) Messenger strand and cable with 1/4" ice and 4 lb. wind plus constants, final	15°	117.7	166.9	222.0	282.6	4912	5427	5882	6306
(4) Messenger strand and cable with 1/4" ice and no wind, final	32°	107.3	153.2	205.2	262.2	4131	4532	4881	5203
(5) Messenger strand with cable in place, no ice, no wind, final	0°	87.5	128.0	174.6	227.4	3529	3774	3986	4182
	15°	89.5	130.3	177.6	230.4	3448	3705	3921	4125
	30°	91.4	133.1	180.6	234.0	3371	3634	3862	4065
	60°	96.0	138.4	186.6	240.0	3218	3495	3737	3957
	90°	100.7	143.8	192.6	247.2	3070	3363	3618	3856
	120°	105.4	149.5	199.2	253.8	2925	3236	3503	3747

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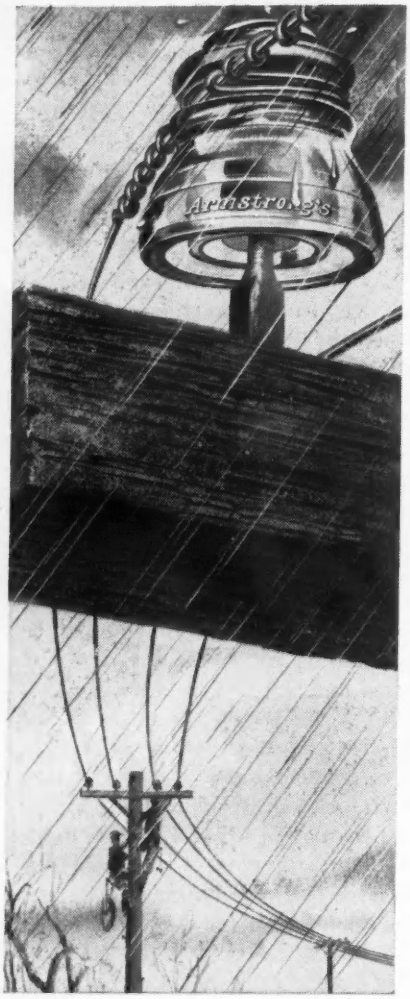
Conduit

A FOUR-PAGE reference sheet, AIA 31-C-62 which pictures and describes vitrified clay multiple duct conduit has been published by Pipe Products Division of Gladding, McBean & Co.

Included in the informative folder are complete descriptions of 2, 3, 4, 6 and 9-duct conduit. Line drawings of each shape are accompanied by dimensions and tolerances. To obtain copy write Readers' Service Dept., 7720 N. Sheridan, Chicago 26, Ill.



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Year-Round Air Conditioning

(Continued from page 48)

of 3200 gpm to 14 individual air-handling units — one on each floor. Since every floor possesses different heat load characteristics, Newcomb and Boyd, Consulting Engineers, designed the system as if 14 one-story buildings were stacked one upon the other. Where areas of any one floor differed in air conditioning requirements, a multi-zone air handling unit is employed. These floors with uniform heat load are served by single zone units.

Pressurized Rooms

IN AREAS with switching equipment only, 10 per cent outside air is drawn in through manually-operated dampers, mixed with return air and passed through a bank of dry-type filters and then into the fan. (In heavily populated switchboard areas — 25 per cent outside air is brought in for mixture with return air.)

The fan blows the air across the surface of a cooling coil, containing chilled water. This conditioned air is then supplied to rectangular shaped ductwork suspended from the ceiling, and is distributed to offices and equipment areas.

It is desirable to prevent leakage of unconditioned air into the offices and spaces. This is accomplished by pressurizing the rooms, in effect through forcing more air in than is returned to the apparatus for reconditioning. This surplus air under pressure of the fans causes an outward flow through doorways, windows and other leakages, and prevents the infiltration of untreated air through windows and door openings.

The original design of the air handling system was guided by two factors:

(1). The present 14-story building may eventually undergo additional construction, therefore no exterior surface was available for one huge air shaft — an obvious distribution method.

(2). Space was not available for installation of vertical risers within the building.

The remaining solution was the use of individual air units on each of the 14 floors.

Existing ventilation shafts were also utilized and loss of crucial operating space was kept to a minimum. Interestingly enough, on some floors switching equipment rises to within 11″ of the ceiling — restricting air ductwork to 8″ in depth.

Telephone communications throughout the country have grown at a fantastic rate — and Southern Bell is certainly no exception. Founded in 1879, the company provides service to a nine-state area from Kentucky south to Florida. A net addition of 462,000 telephone installations was made in 1956 alone — bringing the company's total to well over 5 million. Last year over 300 million dollars were invested in new telephone facilities alone. At present nearly 90 per cent of Southern Bell's phone service is dial operated.

With the tremendous growth in size and complexity of telephone systems, Southern Bell feels that year-round air conditioning is the economical approach — if optimum equipment performance is to be obtained. As a result, dial circuit troubles have been greatly reduced; employe morale and efficiency have been raised; and building maintenance costs materially reduced.

Industrial Equipment

A USEFUL Handbook of Industrial Equipment has been issued by General Industrial Co., to serve as a guide for executives. It contains descriptions of new products on the market . . . ways and means of attaining greater efficiency in the office and plant . . . suggestions of methods for solving maintenance problems, etc.

In addition to new and unusual factory equipment and devices, the Handbook describes several new products.—*Write Readers' Service, TE&M, 7720 N. Sheridan, Chicago 26, Ill.*

Drop Wire Clamps

The telephone industry has known the advantages of the wedge clamp principle for supporting telephone drop wire ever since Reliable first manufactured such clamps about 35 years ago. Reliable's experience and know-how is bound to show the way in this field.

Reliable for years made copper clamps to support the various types of telephone drop wire: dumb-bell type, parallel non-reinforced, parallel reinforced and twisted pair.

Reliable shimmed a copper (PS) clamp for a smoother surface and for a better fit on some of the smaller drop wires.

Now Reliable Stainless Steel wedge type clamps, some types with floating stainless shims, are made for all standard drop wires. (Some different wires such as "C" Rural or Parallel Distribution are best supported by other Reliable devices).

The new, separate, smooth shim is designed for easy sliding action. It provides a metal surface, rather than just the insulation for the wedge to slide on.

Some other clamps have perforated shims. Reliable's new floating shim is not perforated because first, Reliable's shell has a more completely serrated surface (three sides) and does a superior holding job by itself; secondly, with a non-perforated shim, we can be sure our clamps will not pierce the thin insulation on some drop wires.

The P-1 series is all stainless steel. The P-2 series has an aluminum shell, but a stainless wedge. In non-corrosive areas the aluminum shell type will show a substantial saving. In coastal areas the all stainless steel clamp should be used.

Reliable's illustrated price sheet classifies by drop wires all of the new stainless steel-aluminum clamps as recommended.

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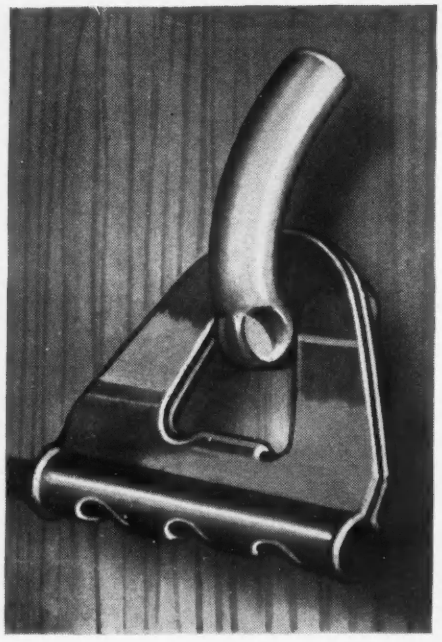

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FIG. 14: — Another type of digger using self-contained 9 or 14 H. P. gasoline engine. This unit is suspended from the derrick boom and is lowered and raised by a hoisting drum at the top of the machine.

Earth Boring Equipment

(Continued from page 46)

up to ten feet deep in any soil. Power is furnished by integrally mounted engine and transmission. Hydraulic controls to increase efficiency and ease of operation are available as optional equipment on this unit. New features include an adjustable clutch which takes its power directly from the transmission, utilizing all speeds of the transmission.

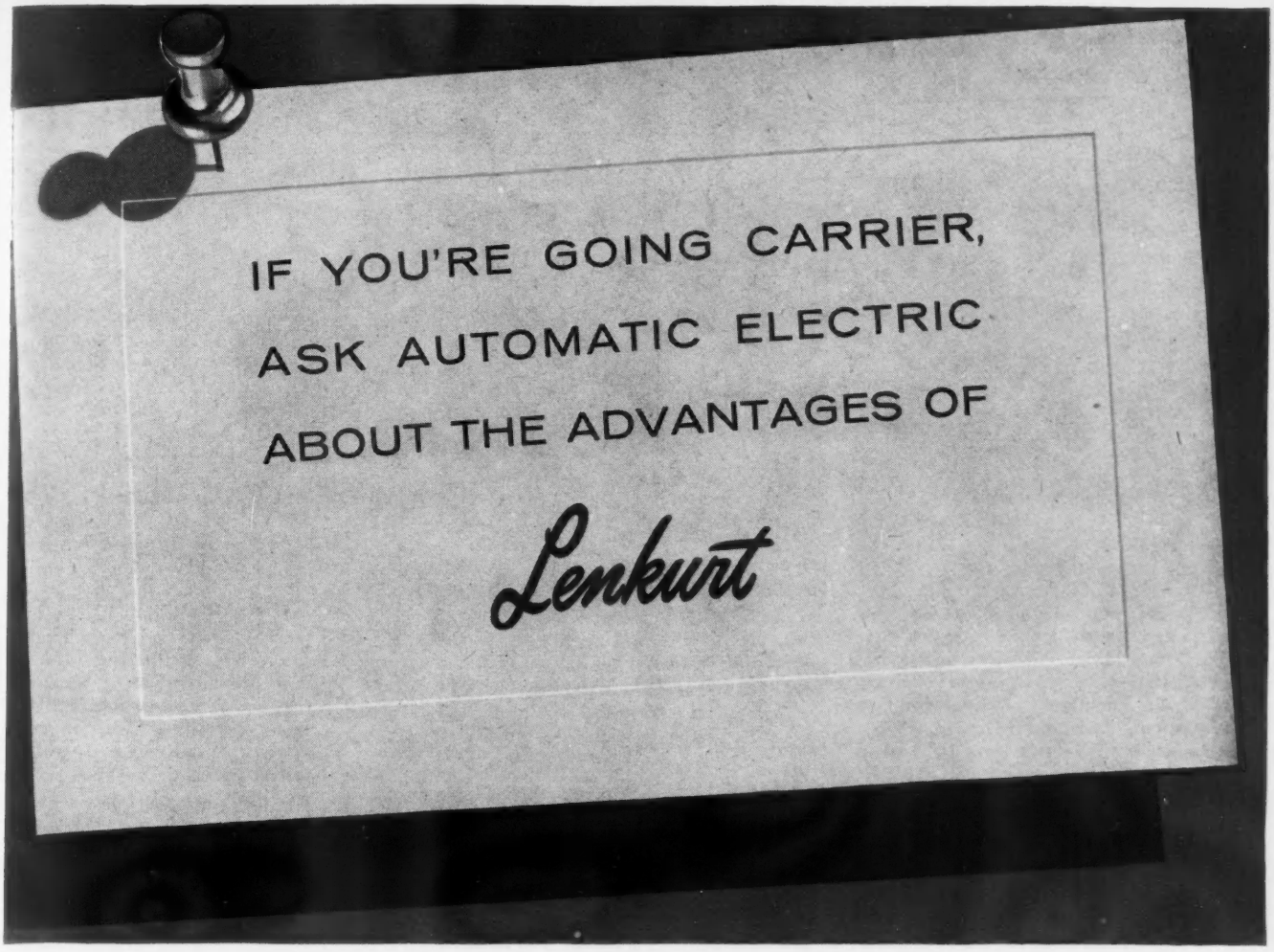
Figure 4 shows another type of earth boring machine designed to operate from a standard four cylinder gasoline engine. The auger unit is driven by the engine which has four speeds forward and one reverse. A hydraulic control system governs the lifting, leveling, and main auger shaft operations. Finger tip controls enable the operator to have complete control of the digger operation. For digging in difficult soil, the machine can be shifted to low gear and then readily shifted back to high gear finger tip control.

A hydraulic power turntable is employed to move the machine within a 180 degree turning radius to either side of the truck body, reducing the necessity for backing and filling the truck to spot the auger in the desired location for digging. A swing mount is also available for moving the auger a short distance to the right or left. A hydraulic-powered winch and derrick is available for use with the earth boring machine.

Figure 5 illustrates another type of digger unit designed for skid or turntable mounting and which employs a gasoline or diesel engine drive with hydraulic feed for sensitive and instant control of the digging operation.

Figure 6 illustrates a type of combination earth borer and derrick on a short, four-wheel drive chassis, which is designed for spot installation of new and replacement poles, as well as for new line construction ordinarily requiring crawler tractors. It is equipped with rear mounted digger and winch.

This digger carrier is said to be capable of being driven over paved and unpaved roads at speeds up to 55 miles an hour without damage to roadbeds. The large rubber tires enable the unit to be operated on landscaped road shoulders and in resi-



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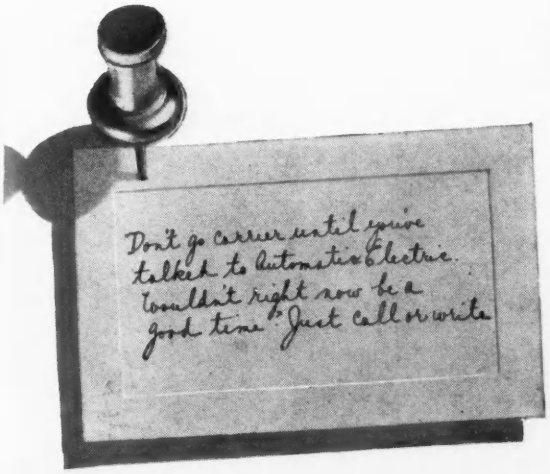

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FIG. 15: — This digger with self-contained engine can raise or lower the auger, turn the auger and spin it to throw off the spoil, all by means of the controls mounted on the machine. The operator does not have to depend on signals to the driver to control the digger operation.

FIG. 16: — This digger unit is the same as illustrated in Figure 15, except that it employs a bucket type anchor.

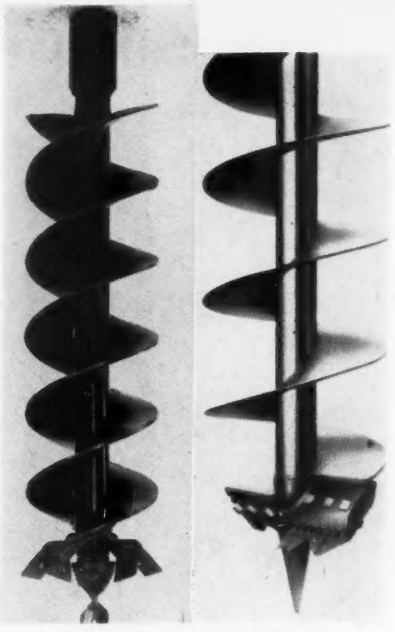

FIG. 17 (left): — Pengo three flight single helix auger with live action fishtail bit to prevent pivoting on rock when the latter is encountered. FIG. 18 (right): — Auger with cutter head designed to cut through roots and to prevent weeds and stones from jamming the blades.

dential areas under normal conditions without tearing up the ground. It can traverse soft grades and mud or sand to reach the pole setting site.

The four-wheel drive digger carrier has 14:00 x 20, 12-ply, 72-inch tread tires. Oscillating front springs and high ground clearance design give this vehicle positive traction for travel in rough areas, with power steering. The front springs lock for stability during digging.

The vehicle is equipped with a one or two-man forward seat and controls for driving the vehicle and while a rear seat (optional) and platform with complete engine and digger controls is provided for the digging operation. In transit, the digger unit rests in a cradle alongside the driver's seat. Power is provided by 150-horsepower engine, with full torque power takeoff for digger and S.A.E. power takeoff for winch operations. It has a five-speed standard transmission and auxiliary transmission for creeping speeds necessary in moving poles, and high speeds required for over-the-road travel.

The forward end of the vehicle's slipper-mount front springs is fastened to the frame in the usual manner, but the rear end slides freely in a saddle which pivots in the middle of the chassis frame, permitting the springs and either front wheel to oscillate vertically. Thus, the unit can "walk" over rough terrain without excessive pitching.

A counterweight front bumper, engine overhang, front spring locks, and solid-mount rear axle furnish proper balance, weight distribution, and stability for digging and pole-setting operations. The frame is heat-treated, manganese alloy steel channel. Open drive line and clear mountings facilitate service and maintenance. The unit is designed for use with or without fold-down windshield and canopy for driver's protection and it may be obtained with enclosed cab and rear fenders.

Portable Type Digger Units With Gear Drive Head

PORTABLE type pole hole diggers are suspended from a pole derrick, either from the winch line or from the derrick boom to which it is attached.

A mechanical type pole hole digger is shown in *Figure* 7. It is designed to reach up on hills, down into ditches, or across obstacles. It has an auger (available in 8 to 20-inch diameters) that is powered by the truck engine. A telescoping drive shaft to the auger from a power takeoff extension permits drilling 8-foot deep holes up to 20 feet behind the truck. The pole hole digger works equally well in trucks equipped with rear mounted derricks.

To dig a pole hole, the truck is driven to the site, the digger is attached to the winch line derrick boom and the auger is set down on the hole location. The power takeoff is engaged to drive the auger while its downward motion is controlled by the boom line. A crewman in the cab operates the auger drive and boom line and the ground man directs the auger's drilling angle with the hand guide. When the auger is loaded with spoil (soil material), it is stopped and removed from the hole. The spoil is thrown off by spinning the auger above the ground.

To set the pole, the winch line is employed to raise the pole and lower it into the hole without in any way disturbing the position of the digger. If it is necessary to move the derrick boom and the digger would interfere with this operation, it is temporarily stowed out of the way with a sling.

When it is desired to extend the digger for reaching a certain pole hole location in hard-to-get-at places, the digger is unfastened from the clamping bracket and suspended from the winch line for lowering or raising the digger. The winch line control is employed instead of the boom line control in this case. When

setting the pole, the digger unit is laid on the ground leaving the winch line free for the pole setting operation. To move to the next pole site, the digger is picked up in the normal manner and the truck is driven to the next location.

A hydraulic type of pole hole digger with gear drive head is illustrated in *Figure* 8. As the diagram in *Figure* 9 indicates, this digger has a hydraulic motor that operates from an oil drive system installed in the truck and connected thereto by hoses. The motor drives a gear train in a housing at the digger head. Power is supplied by a power take off driven gear pump. and precisely controlled by a spool valve. The pump has a capacity of approximately 20 gallons per minute at 1250 rpm and at 1000 psi. A relief valve returns the oil to the reservoir tank when the pressure exceeds a pre-set maximum. This protects the power take off and transmission gears from severe shocks. and eliminates the need for using shear pins.

Due to the fact that hydraulic power is employed, the digger operates smoothly. One man guides the digger into the ground with a pivot mounted handle while another operates the hydraulic control from the cab or at the rear of the truck. When the digger is pulled out, the man at the controls shakes off loose spoil by moving the lever back and forth rapidly to produce a shimmying action. After the hole is dug to the desired depth, the pole can be set in the hole. When the digger is attached to the derrick boom it is not necessary to lay the digger to one side or support it from another winch line.

This digger unit is capable of dig-

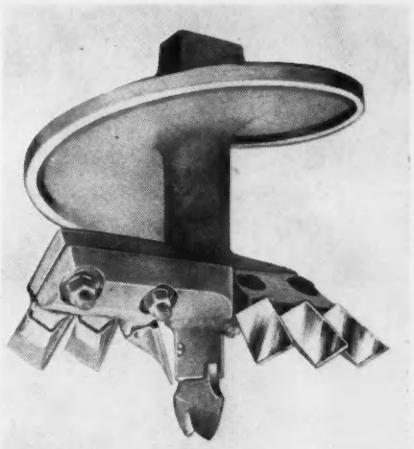

FIG. 19: — Auger with forged alloy steel fishtail point designed for use in extremely hard soil. The teeth on the free arm balances in cutting action and loosens material for the flight on the opposite side to pick up.

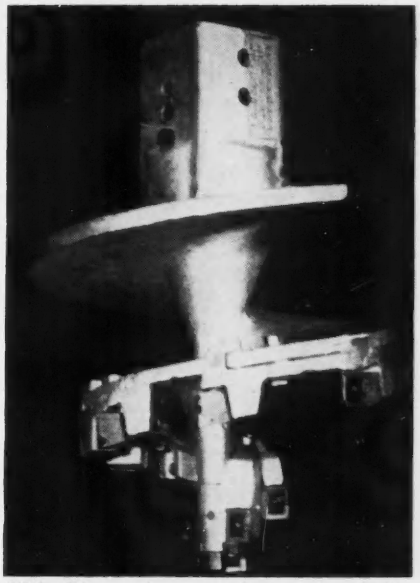

FIG. 20: — Auger with tapering helix and carbide tipped points for drilling.

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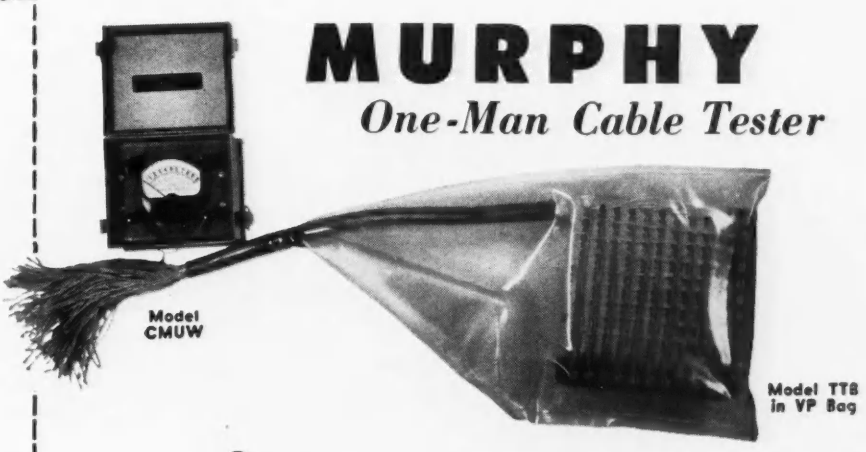

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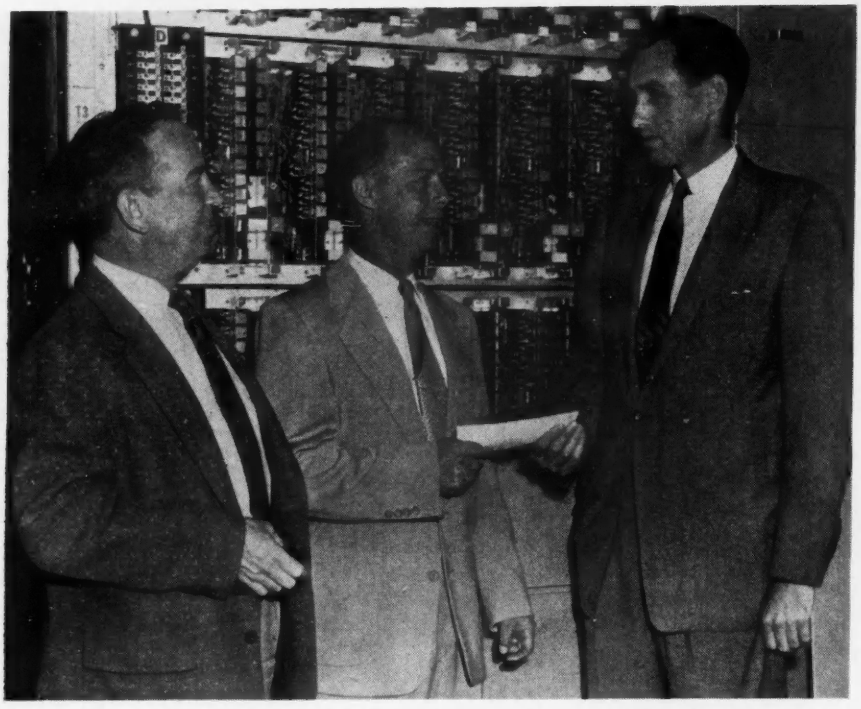
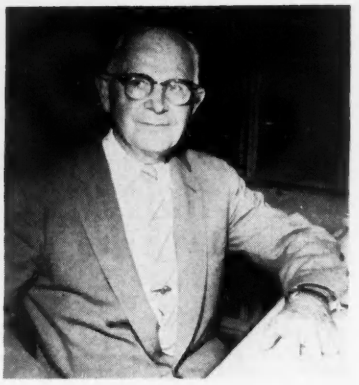


EARL VAN WIE (center) receiving cash award from GEORGE T. SCHARFFENBERGER (right), pres., of Kellogg Switchboard & Supply Co. At left, is H. G. O. WEILER, president of the Southern Nevada Telephone Co.

SIGNAL CORPS and Highway Trailer Co. representatives complete field operational tests on demountable earth boring machine at Edgerton, Wis., where unit was built. Reading from left to right: HENRY C. STRICKER, JR., Highway chief engineer; HAROLD RYDER, Signal Corps Engineering Laboratory, Fort Monmouth, N. J.; MARVIN G. GIETZEL, Highway asst. chief engineer; NORMAN YESKE, Highway general foreman, utility division; and GEORGE CONNORS, Highway product design engineer.

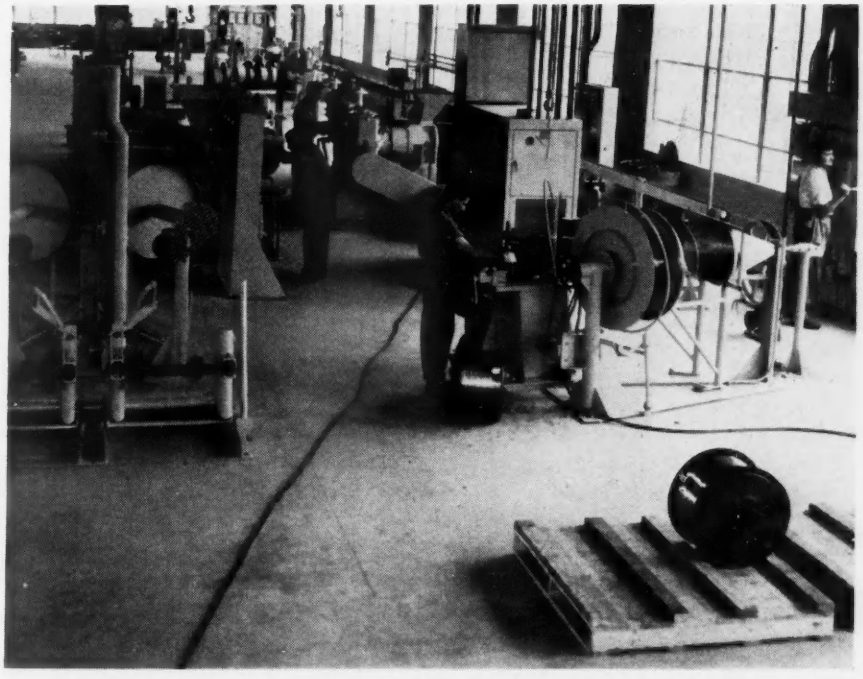
NEW YORK ASSOCIATION officers (l. to r.): Vice President ALBERT N. SEWARD of Jamestown; President, C. RAY LLOYD of Manlius; and Executive Secretary HAMILTON A. CUNNINGHAM of Albany.



BERT WALLACE, assistant director of engineering, Kellogg Switchboard & Supply Co., Chicago, retired recently after 43½ years of continuous service with the company. Since joining Kellogg in 1914, Mr. Wallace has actively engaged in all phases of engineering design and development of telephone switching equipment and apparatus. He was also project engineer on the original development of dial switching equipment. In addition, he has numerous inventions covered by United States Patents assigned to the Kellogg Company. Many of these patents have counterparts in foreign countries. Mr. Wallace is a member of the Chicago Chapter of the Armed Forces Communications and Electronics Association; Consulting Member, Communications Section, Association of American Railroads Committee on Inside Plant Equipment; and Member of IT&T Technical Committee #7.

Plan to Attend USITA's 60th Anniversary Convention, at Conrad Hilton Hotel, Chicago, October 14, 15, 16.

LA CROIX AWARDS for extraordinary deeds and services were made to nine employes of the General Telephone Co. of California recently at a special luncheon in Santa Monica, Calif. FRANK HESS (left foreground) equipment installer at Santa Monica, is seen receiving the silver medal for heroism, first of its kind to be granted, from EDWIN M. BLAKESLEE, company president. CHARLES WEILAND (right foreground) Santa Monica engineering fieldman, received the bronze medal. Back row (L to R) are GRADY SAIN, EDGAR WISE and ROBERT GRAFF, plant department in Redondo, bronze plaque citations; LORAINE BRANDT and MARY LOU ARCHER, Reedley operators, and RUTH COLLETT and BEVERLY J. PANGBORN, Whittier operators, certificates of meritorious service.



CUBA'S FIRST COPPER fabricating plant was opened at Havana last month by joint owners, Banco de Fomento Agricola e Industrial de Cuba (Banfaic), Holland Insulated Wire & Cable Works, Ltd. (Draka), Amsterdam, and Phelps Dodge Corp., New York. The new company is known as Productos de Cobre de Cuba PhelDrak, S. A. Picture shows some of machinery used for drawing and then extruding various types of copper wire and cable. The latter will be used for transmission of electric power from electric utility companies through overhead lines into factories and homes, as well as building wires and cords necessary for operation of electrical appliances and machinery. PhelDrak also makes telephone and signal wires and cables for communications industry.

LOUIS D. YARD, general plant manager for General Tel. Co. of Calif., has been named chief engineer for General Tel. Co., of the Southwest, San Angelo, Texas. A member of General's staff since 1936, Yard began his career with the company as an instrument shopman in Ontario. He was transferred shortly thereafter to Pomona as a plant clerk, where he remained until 1939 when he became a fieldman in Long Beach.

HAROLD A. HAHLBECK, operating vice president, General Tel. Co., of Ill., has been named general manager, General Telephone Co., of Calif. Hahlbeck joined the General Tel. Co., of Illinois in 1953 as assistant to the vice president. In April of 1955, he was appointed operating vice president of the company. He started his telephone career with the Hooper (Minn.) Tel. Co., in 1919 as a combination man. After several years there, he joined the Northwestern Bell Telephone Co., and held various plant and engineering positions with that company.

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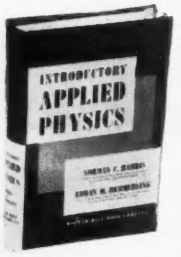

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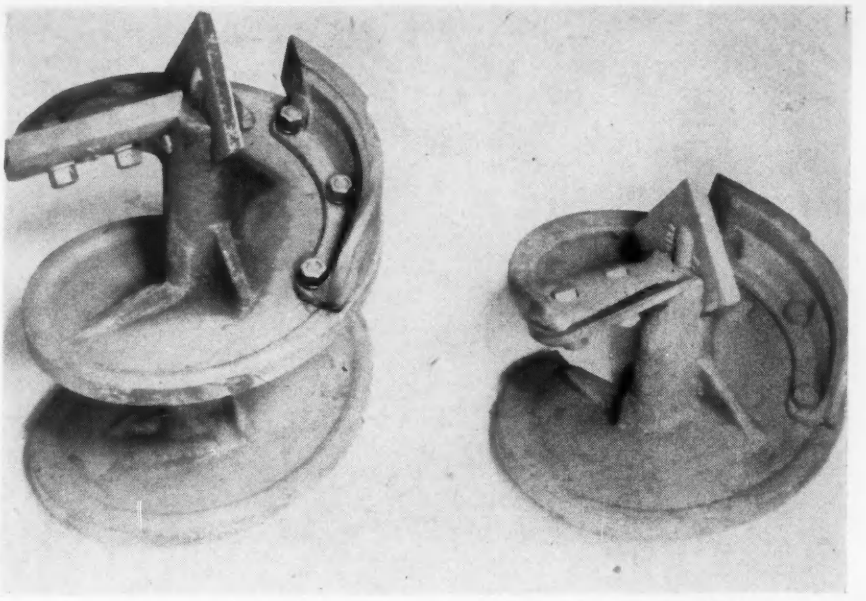

FIG. 21: — Left — 16″ high spiral auger for digging in stoney soil where large rocks are to be removed. Right — 16″ regular auger for drilling in shale and ordinary soil.

ging 8 foot deep holes with auger diameters of 8 to 20 inches. Special augers are available for heavy duty digging in difficult soils.

For trucks not equipped with hydraulic drive systems, the same type of digger can be provided with a drive shaft connection for operation from a power take-off.

Another type of hydraulic digger utilizes a guide and torque frame on which the auger unit rides as it is forced into the ground. This machine, illustrated in *Figure* 10 is a pressure feed hydraulic digger with sensitive remote controls. It is said to be capable of digging rapidly in most types of soils, including frost and hardpan. Since it is supported from the derrick boom, it is capable of reaching hard-to-get-at areas. It can be retracted and laid flat on the top of the truck along with the derrick.

Figure 11 illustrates the component parts of this novel digger. Typical specifications for the digger are listed below:

Type of power, Hydraulic; No. of hydraulic motors, Two — reversible type; Function of motors, First: — Applies down pressure or raises auger, Second: — Rotates auger forward or reverse; Purpose of frame, To serve as guide and torque member; Hydraulic pressure required, 1500 *pounds per square inch; Fluid reservoir required,* 40 *gallons; Pump capacity required,* 22 *gallons per minute; Recommended pump speed,* 1400 *RPM; Auger type, Screw flight; Auger sizes,* 11″—14″—18″—22″; *Digging depth, standard,* 7 *ft.; Digging depth with auger extension,* 9 *ft.*

This type of hydraulic digger can be quickly positioned for fast digging. Rapid and smooth downward digging is obtained by a chain crowd assembly. Reversible hydraulic motors rotate the auger and operate the feed mechanism. Together with the pressure exerted by the derrick a powerful down thrust is exerted on the auger to overcome hard soil conditions.

The digger is suspended from a derrick swivel, back of the derrick sheave, and it does not have to be removed for the pole setting operation. The swivel mounting permits freedom of movement and enables angle digging for anchor holes. A typical pole hole digging operation is shown in *Figure* 12.

Diggers with Suspended Self-Contained Engine

DIGGER units with self-contained gasoline engines suspended from the derrick winch line or boom are available. Such units do not require connection to a power take off and are claimed to be quite economical to operate. Since they are completely self-contained, they may be transferred from one truck to another.

The digger unit illustrated in *Figure* 13 consists of an 8.2 H.P. gasoline engine with chain drive to a gear box transmitting power to the auger. The chain drive is of the torque limiter type for added safety. A torque bar sliding in a torque

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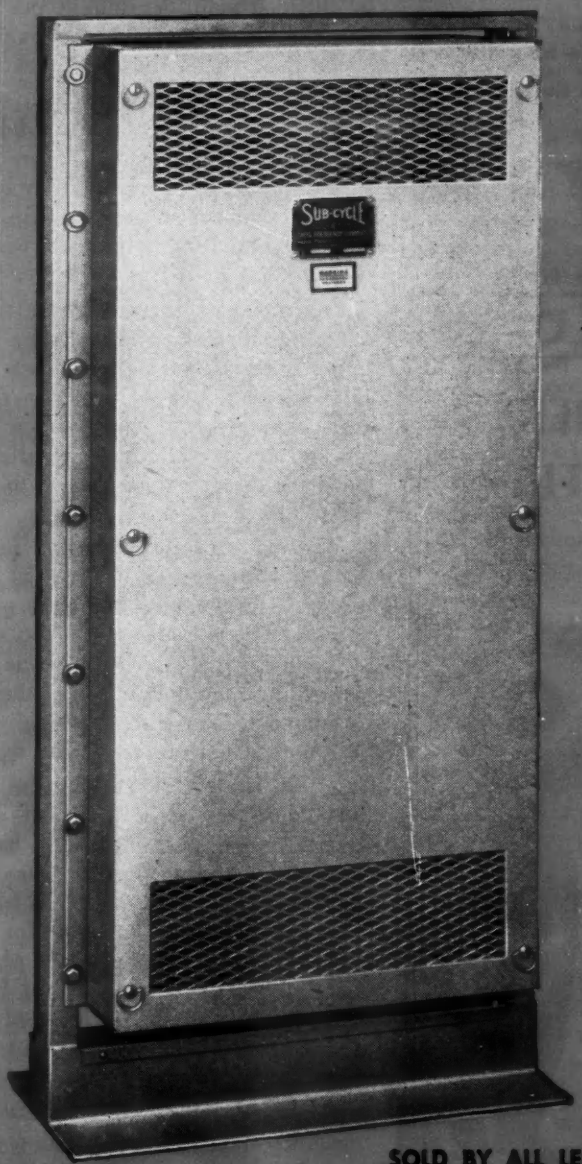

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The Model S-5 can be equipped to supply either 15 cycles or 20 cycles as the fifth frequency; if only four frequencies are required, the converter is designated as a Model S-4. A minimum of floor space, only 24-3/8" by 15", is required.

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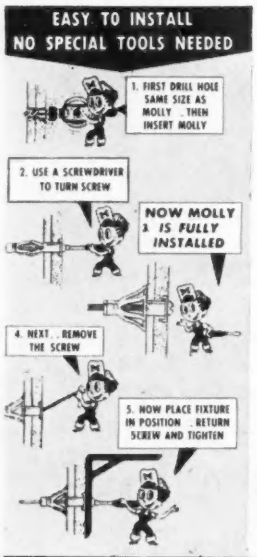
EASY TO INSTALL
NO SPECIAL TOOLS NEEDED
1. FIRST DRILL HOLE SAME SIZE AS MOLLY . . THEN INSERT MOLLY
2. USE A SCREWDRIVER TO TURN SCREW
NOW MOLLY IS FULLY INSTALLED
4. NEXT . . REMOVE THE SCREW
5. NOW PLACE FIXTURE IN POSITION . . RETURN SCREW AND TIGHTEN

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7. Apparatus does not have to be held while anchor is being installed

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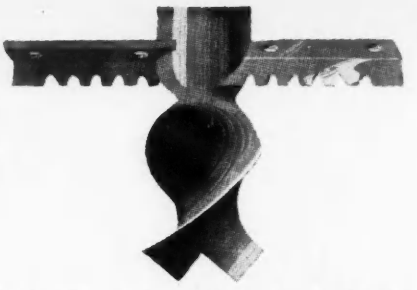

FIG. 22: — This drill head is designed to bore through extra hard soil, hard pan, sandstone, shale and permafrost.

frame prevents turning of the engine unit with the auger rotation. The auger is capable of digging a 6-foot hole with an additional depth of one foot possible through the use of an auger extension. Auger sizes range from 6 to 24 inches in diameter. The weight of the digger enables digging in difficult soil. Various types of auger heads are available for digging in hardpan, shale, and coral rock.

Another type of digger with self-contained engine that has a self-hoisting feature is illustrated in *Figure* 14. It is designed to operate on any type of derrick and is suspended from the derrick boom, leaving the truck winch free for use in setting the pole.

Controls are provided for raising, lowering, turning, and spinning the auger independently of the truck engine and winch line. With the controls mounted on the machine as shown in *Figure* 15, the operator does not have to depend on signals to the truck driver.

When the digger employs a flight type auger (*Figures* 14 *and* 15) the auger is turned until the flights are full of spoil and then raised to spin off the spoil. This operation is repeated until the hole is dug to the desired depth. *Figure* 16 shows a digger unit with a bucket type auger which operates to dump the spoil at the side of the hole.

The digger unit illustrated has a 9 H. P. gasoline engine, though a 14 H. P. engine is available for heavy duty use. An electric starter for the engine is an optional feature of the machine. Power is transmitted from the engine to the gear head of the auger with idler clutch and no slip clutch or shear pins required.

A verticle guide pipe holds the machine in an upright position during the digging operation as when a pole hole is to be dug. It enables the weight of the digger to be applied to the auger without causing it to tilt

to one side. A torque rod extends from the machine to one leg of the derrick and keeps it from rotating with the auger. The digger can be employed to bore an anchor hole by tilting the machine to the desired degree when starting the hole and it will continue boring at the set angle to the desired depth.

The 9 H. P. digger weighs 500 pounds and the 14 H. P. unit, 1000 pounds, which is stated to provide sufficient weight for forcing the auger into hard or frozen soil.

Types of Augers for Earth Borers

THE SUCCESSFUL operation of an earth boring machine may depend to a great extent on the proper type of auger employed with it. In firm soil, such as loam, sandy loam, or ordinary clay, augers with conventional steel blades and piercing tip will work satisfactorily. In somewhat harder soil or frozen crust, they will require greater applied pressure and slower rotating speed to successfully cope with the more difficult material.

As the result of the experience of many companies including highway construction firms and others not in the telephone business many types of augers have been developed to bore holes in materials of varying degrees of hardness. *Figures* 17 *to* 23 illustrate the different augers that are available for various kinds of soil.

Augers are constructed with a single flight (spiral) or several flights, single- or double-helix. Augers with three or more flights are best adapted to digging in materials such as sand, gravel, pumice, and chalk. Such augers reduce the number of up and down trips of the auger to bring out the material and cleans out the bottom of the hole more effectively. An example of a three flight, single-helix auger is shown in *Figure* 17.

On the other hand, augers with one or two flights are more satisfactory in shale or similar soil material where large pieces of rock are brought up. Such large pieces might jam in augers having a number of flights. Single flight augers are shown in *Figures* 19, 20, *and* 21.

Augers for boring in rock are illustrated in *Figures* 20, 22, *and* 23. These augers are of special construction with carbide tipped teeth to break up the rock into pieces that can be brought up with the auger.

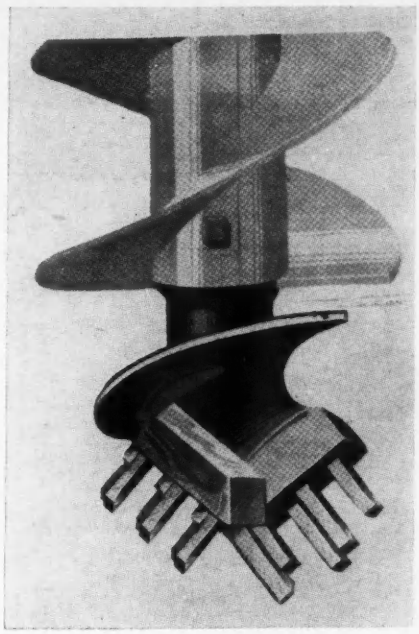

FIG. 23: — This special drill head is intended for drilling in coral rock as well as other hard soil materials.

An example of the operation of such a special auger head is described here through the courtesy of the Alaskaug, Inc. The auger is cast out of fine tool steel heat treated for maximum hardness and tensile strength and features a tapered helix with graduated carbide tipped cutting teeth. In use, the auger employs a quarrying principle in which each cutter works on its own narrowing quarrying shelf. By separating the material and dividing it into narrow edges, the cohesive strength of the mass is destroyed. The material is then broken up and quarried. The auger also employs a cutting action similar to chiseling or gouging, that is, the carbide cutting edges sink under the weight of the auger into the stone and then, when the auger is rotated, they fracture out chunks of the rock.

The auger must be rotated at a slow enough speed to allow the edges of the carbide tipped cutters to sink into the stone. The principle is the same as striking the stone with a chisel and hammer. To force the carbide into the rock, there must be sufficient down pressure exerted on the auger to force the carbide edges into the rock, therefore, in operating this auger, as much pressure as possible must be applied and the auger rotated at a low speed (15-25 revolutions per minute). High pressure and extremely slow speed (less than 10 r.p.m.) are especially important when drilling highly abrasive material such as silicious sandstone. High speed rotation of the auger in this material will ruin even carbide tipped cutting edges in a very short time.

It is important to know the degree of hardness of rock formations in the area where drilling is done. In general, if the rock can be scratched or cut with a pocket knife, it can be bored with augers having carbide cutting edges.

In using this special type of auger, the nature of the spoil will indicate whether the auger is doing its work efficiently. If the spoil contains chunks of rock, the auger digs faster than when a fine substance comes up. If the spoil is fine in appearance, the auger pressure should be increased or its speed reduced or both. Before applying maximum pressure, the carbide inserts should be allowed to seat themselves in the rock. If allowed to ram into the material, the inserts may be damaged.

In ledge rock or interrupted cuts, the auger should be operated at slow speed and broken ledges should be worked loose. Striking loose rocks at high speed has the same effect on the carbide tips as striking them with a hammer.

Conclusion

THE EXPERIENCE of the great majority of telephone companies is that the proper type of earth boring equipment with the right kind of auger for the soil material in their area is a very profitable investment. For small companies, the initial cost of the equipment best suited for their purpose may prove an almost insurmountable barrier. Yet rapidly expanding housing developments in their operating areas have forced them to expensive increases of service facilities. Some of these companies have resolved their dilemma by purchasing a second hand machine, in some cases on time payments. Satisfactory results have been reported from programs of this kind.

Credits

Illustrations for this article were furnished through the courtesy of the following companies:

Figures 3, 10, 11 — *Highway Trailer Co.*

Figures 4, 21 — *Wyoming Valley Equipment Co.*

Figure 5 — *Acker Drill Co., Inc.*

Figure 6 — *Four Wheel Drive Auto Co.*

Continued on next page

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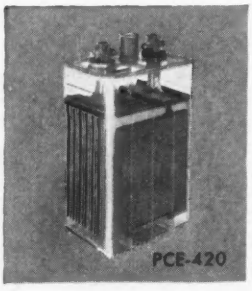

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SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

Figure 7 — *Tel-E-Lect Products, Inc.*

Figures 8, 9, 18 — *J. H. Holan Corp.*

Figure 12 — *McCabe Powers Auto Body Co.*

Figures 13, 22, 23 — *Roper Manufacturing Co.*

Figures 14, 15, 16 — *Foushee-Heckendorn.*

Figure 17 — *Peterson Engineering Co.*

Figure 19 — *H & L Tooth Co.*

Figure 20 — *Alaskaug, Inc.*

Linen Thread Co., Develops New, Nyak Lacing Cord

THE LINEN THREAD CO. has announced the development of a new lacing cord, known as "Barbour's Waxed Nyak Lacing Cord." Available in #6, 9, 12 and 15, this new lacing material is said to have excellent knot holding ability.

Further information is available from The Linen Thread Co., Inc., 418 Grand St., Dept. TE&M, Paterson 12, N. J.

Rex Corporation Appoints Member To Sales Staff

REX CORP., West Acton, Mass., manufacturers of wire and cable, insulating materials and other electronic

J. C. CALLAHAN, JR.

products, has announced the appointment of Jerome C. Callahan, Jr., to its sales staff.

Callahan is an air force veteran and graduate of the Army Air Force Radio, Electronic and Radar Schools. He is a graduate of Boston College, and attended Worcester Junior College where he studied industrial organization and control.

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The Board of Directors declared a quarterly dividend of 30 cents per share on the outstanding common capital stock of the company, payable on or before September 30, 1957, to stockholders of record at the close of business August 28, 1957.
Abilene, Kans. August 8, 1957
ALDEN L. HART, President

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Stromberg-Carlson Names Gleason to New Post

HOWARD S. GLEASON, formerly manager of marketing of the Electronics Division of Stromberg-Carlson, has been appointed assistant

HOWARD S. GLEASON

general manager of the division, by George A. Peck, vice president and general manager.

Mr. Gleason, a mechanical engineering graduate of the Mass. Institute of Technology, joined Stromberg-Carlson's Research Department in 1946.

$999,875 Security Issue OK'd For Highland Tel.

THE NEW YORK Public Service Commission has authorized Highland Telephone Co., Monroe, to issue new securities aimed at producing $999,875. Included will be 6,795 shares of no par value common stock, of which 2,350 shares will be sold at $42.50 each and 4,445 shares will be reserved for conversion purposes; $200,000 in four percent 15-year convertible debentures, and $700,000 in 5⅜ percent 25-year first mortgage bonds.

Proceeds of the new securities will be used to discharge short-term debt obligations aggregating $990,000 incurred by the company during recent months in order to finance plant expansion and improvement programs, with the balance to be used to finance additional plant improvements.

The company provides telephone service to about 9,000 main stations in and near Monroe, Washingtonville, Highland Mills, Maybrook, Chester and Goshen, all in Orange County, N. Y. Except for the Goshen exchange, which was purchased by the company late last year, all exchanges now provide dial service. Plans are now under way for conversion of the Goshen exchange. The company contemplates the expenditure of about $427,500 this year for construction of new dial central office and central office buildings in Goshen and the installation of automatic toll ticketing equipment which will permit direct distance dialing through all of its exchanges.

In a report to the Commission, Examiner William T. Wilkinson stated the company proposes to sell its new shares of stock and the debentures to residents of its service area, with present shareholders being given preemptive rights to purchase them initially. The mortgage bonds will be sold to Berkshire Life Insurance Co., Bankers Life Insurance Co., and the Fidelity Life Insurance Co.

Gulf States Tel. Co. Completes Groesbeck Cutover

MONDAY, July 29, was D-Day for Groesbeck, Texas, as employes of the Gulf States Telephone Co., completed installation of dial equipment at the Groesbeck office.

More than one quarter of a million dollars was invested by Gulf States Telephone to bring dial service to Groesbeck subscribers.

Approximately 1000 telephone users are served in Groesbeck and the equipment has been installed to allow for double or more than that number of subscribers without adding further switchboard facilities.

Special arrangements with Southwestern Bell Telephone system will make Groesbeck a toll center.

JAMES L. READ, formerly general traffic supervisor for General Tel. Co. of Mich. has been named general personnel supervisor reporting to the director of personnel, H. M. Borys. In his new capacity, Read will supervise the administration of personnel policy in the 155 exchanges which form the company's service area.

Carolina T. & T. Sells Debentures Issue

ON AUGUST 1 Carolina Telephone & Telegraph Co., Tarboro, N. C., issued and sold $14,000,000 principal amount of 30-year, 4¾ percent debentures at private placement. Proceeds of the debenture sale will be applied to the reduction of outstanding short-term bank loans.

The order of the North Carolina Utilities Commission authorizing the financing summarized the company's progress since the end of World War II.

Pointing out that post-war demand for telephone service in the forty-one county territory served by the company has been the greatest in the company's history, the order stated that since the end of the war, Carolina company telephones in service have increased from 55,814 stations at December 31, 1946 to 147,953 stations at the end of May 31, 1957. This is an increase of over 165 per cent. In 1947 the company handled a daily average of 398,445 telephone

messages. During the first five months of 1957, the average number of daily telephone messages has been 814,786.

The increased demand for service and the growth of the company, with improvements to its plant and facilities, have been the direct cause of the greatest construction activities in the history of the company. In 1956 gross additions to telephone plant exceeded any previous twelve months' period and resulted in the largest station gain in the company's history. During that year a total of 12,304 stations were gained requiring an inward movement of more than 46,500 stations.

The accelerated construction program is being continued during 1957 and the station gain for the first five months of this year was 4,074.

In Carolina Telephone & Telegraph Company's construction and improvement program, gross additions to telephone plant for the period extending from January 1, 1947 to May 31, 1957 have approximated $77,548,000 and net additions (excluding construction work and progress) have approximated $58,652,960.

If present demands for service continue and provided the company is able to procure capital required, it is estimated that expenditures for total telephone plant and facilities will approximate $6,000,000 in the remainder of 1957.

New Rates Approved For Chenango & Unadilla Tel.

THE NEW YORK Public Service Commission has accepted a tariff amendment filed by The Chenango & Unadilla Telephone Corp., Norwich, designed to increase rates by an estimated $139,800 annually.

The new tariff provides for increases of 50 cents monthly for residential service and $1.00 monthly for business service.

The company serves about 27,000 telephone stations in Broome, Chenango, Delaware, Madison, Oneida, Onondaga, Otsego, Tioga and Tompkins Counties, N. Y., through 34 central offices. The new rates will apply to subscribers of all exchanges except those at Clayville where toll-free service to Utica is provided and at Chenango Bridge where toll-free service to Binghamton is provided. Rates now charged at Clayville and Chenango Bridge are the same as apply to New York Telephone Co., sub-

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NO-WRENCH SCREW

For hand or machine installation. Pitch-controlled blade goes down faster and adds to holding power in sandy soil, soft clay or loam.

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For heavy-duty anchoring in machine-bored holes. Holds better than logs or slugs. Saves time and money.

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For swamps, marshes, quicksand, river crossings or seasonally flooded areas. Screws down deeply by adding sections of pipe.

8-WAY CONE

Acts as inverted wedge. Flaring base and flat faces increase wedging action. Used in rocky areas with rock wedging.

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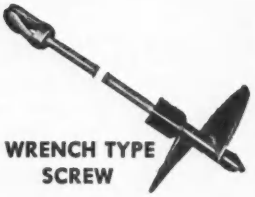
No grouting necessary. The greater the pull, the tighter it wedges against solid rock. Set in 2" drilled hole.



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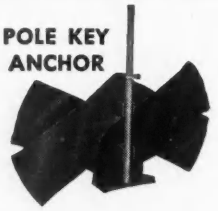
All steel—double arc welded. Anchor hub absorbs installation strain. For light loads in sandy soil, soft clay or loam.



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Protect your investment in line construction. Analyze your soil and guying conditions, and specify the Chance Anchors that meet your particular requirements.

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scribers in Utica and Binghamton respectively and will be continued.

Chenango & Unadilla Telephone Corp., was formed in 1922 as the result of the merger of three small companies. It has since acquired ownership of 19 adjacent companies, many of whose plants were in need of rehabilitation. As a result of an extensive modernization program undertaken in recent years at a cost of several million dollars, 22 of the company's 34 exchanges and 75 percent of its subscribers stations have been converted to dial operation. Plans are now under way for the conversion of 10 more exchanges.

In filing its new rates, the company said that additional revenues were needed to offset major increases in operating expenses and to enable it to continue adequate service.

Middleburgh Tel. Takes Over Schoharie Tel. Exchange

THE NEW YORK Public Service Commission has authorized Schoharie (N. Y.) Telephone Exchange, Inc., to transfer its franchise, works and system to The Middleburgh (N. Y.) Telephone Co. by September 30. No financial consideration is involved since Middleburgh Telephone purchased all of Schoharie Telephone's outstanding stock in May for $53,336.90.

Schoharie Telephone Exchange now provides service to about 670 telephone stations in and near the village of Schoharie through magneto and common battery switchboards. Its service area includes portions of the towns of Schoharie, Middleburg and Wright, all in Schoharie County, N. Y.

Middleburgh Telephone furnishes dial service to about 1,400 stations in portions of Albany and Schoharie counties through exchanges in Middleburg, Franklinton, Breakabeen and Bramanville.

At a public hearing on the proposed property transfer, Middleburgh officials testified that plans are now under way for the conversion of Schoharie Telephone's system to dial operation in about two years. The cost of that work is estimated at about $150,000. The 10-cent toll charge for calls between the systems of the two companies will be continued until after Schoharie's plant has been converted.

In connection with the property transfer, the PSC will issue a new

certificate of public convenience and necessity to Middleburgh Telephone authorizing it to operate in its expanded service area after it has amended its certificate of incorporation to include in it the new territory to be served.

In a report to the Commission recommending approval of the proposed transaction, Examiner William T. Wilkinson stated that the transfer is in the public interest.

General Telephone System Names Two Board Members

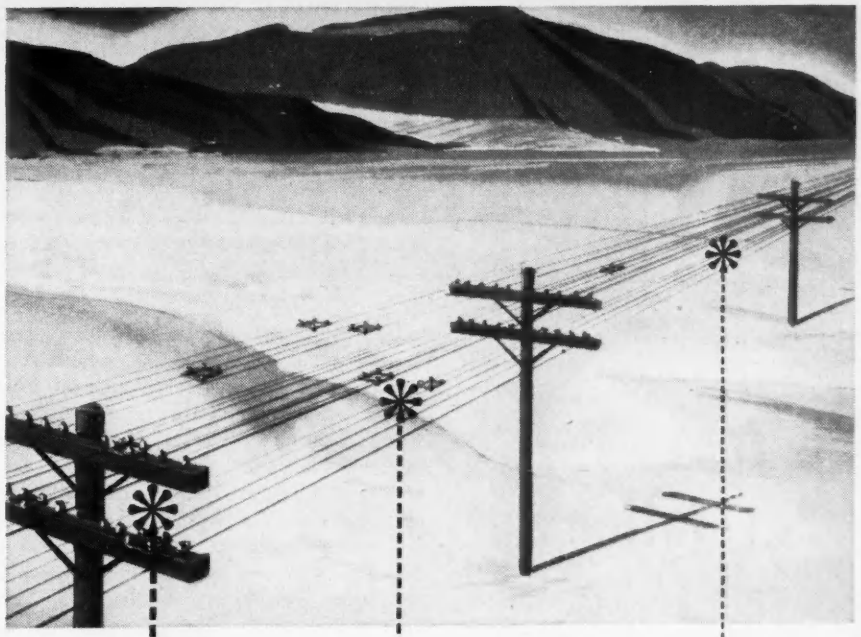
CARL D. BROREIN, president of the Peninsular Telephone Co., Tampa, Fla., and John B. Prizer, vice president and general counsel of the Pennsylvania Railroad, have been named members of the board of directors of the General Telephone System.

Following graduation from the University of New Mexico in 1917, Brorein joined the U. S. Marine

CARL D. BROREIN, president, Peninsular Tel. Co., Tampa, Fla., has been named a director of General Tel. System.

Corps and rose to the rank of Captain. He joined the Peninsular company as corporate secretary in 1920, at which time the firm was operating about 14,000 telephones. The company now operates in excess of 300,000 telephones. Brorein has been president-general manager since 1938.

He is past president of the Florida Telephone Association and of the Independent Telephone Pioneer Association, and presently is on the executive committee of each. He is a former president of the Florida State Chamber of Commerce and of the Tampa Chamber of Commerce, and is



CASE after CASE after CASE

Case

TRANSPOSITION BRACKETS

proved best...world wide

Transposing wires to help expand toll circuits, carrier systems, balance out cross-talk and reduce noise levels has proven itself, installation after installation, throughout the world.

Case aluminum Transposition Brackets for cross-arm and span-point transpositions have proved to be the outstanding choice.

● **Unique span-point design**... the only bracket designed especially for mid-span transpositions... eliminates the need for special transposition poles.

● **Lightweight**... Case non-corrosive aluminum cross-arm brackets weigh only 4 lbs.*; the span-point bracket weighs only 3½ lbs.*

*(including insulators and bushings)

● **Roller system**... Case brackets feature insulators that roll, eliminate wire dragging on insulators and bracket distortion, protect wire insulation in stringing.

● **Special rubber bushings**... In the event of glass insulator breakage, the line wire falls on the rubber bushing, with no loss of communication service.

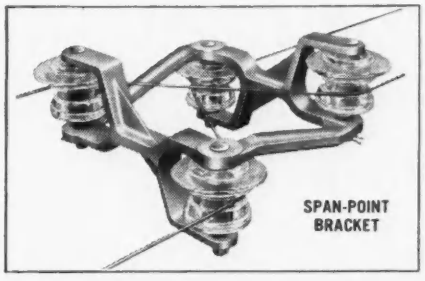
SOLD BY LEADING DISTRIBUTORS IN THE U. S.

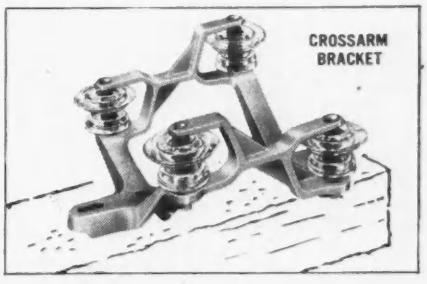
CASE BRACKETS... STRONG, LONG-LASTING, ECONOMICAL, ESPECIALLY ADAPTED FOR CARRIER-CIRCUIT CONSTRUCTION

Write today for free illustrated brochure.

TRANSANDEAN ASSOCIATES, INC.

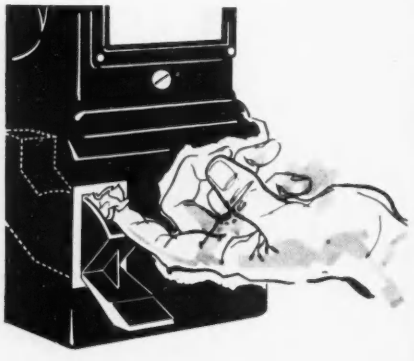
304 MAIN STREET, ORANGE, NEW JERSEY





Chicago Daily Tribune
PRISONER ADMITS CHEATING COIN BOX PHONES OF $8 A DAY
If Your Paystations Aren't Protected
... they should be!

A stuffed coin chute cheats the paystation user of refunded coins—and cheats you of customer good will! Automatic's Anti-Stuffing Coin Return makes this *impossible*. When it is closed, nothing can be inserted into the chute. When open, refunded coins are easily obtainable and the coin chute is blocked.



Automatic's Anti-Stuffing Coin Return fits both new and existing paystations. Write today for price and delivery information. Address: *Automatic Electric Sales Corporation, Northlake, Illinois. Or call FIllmore 5-7111.*

AUTOMATIC ELECTRIC
A member of the General Telephone System
One of America's great communications systems

New Autelco Paystation Offers Type 80 Telephone Features

Automatic Electric's new "80" series paystation has a familiar look to it. That's because it incorporates the outstanding features found in Automatic's famous Type 80 Desk Telephone.

Improved transmission is probably the most important feature of this paystation. The transmitter and receiver are non-positional, to help give lifelike reproduction of speech. Through the use of an entirely new induction coil and balancing network, the anti-sidetone balance has been greatly improved. This reduces sidetone, over a variety of line conditions, and causes the user to adjust his voice to the level which will give the most effective transmission. A simple adjustment enables the installer to adjust the line current for best transmission, whether line is short or long. This assures all-around efficiency on both local and long-distance calls.

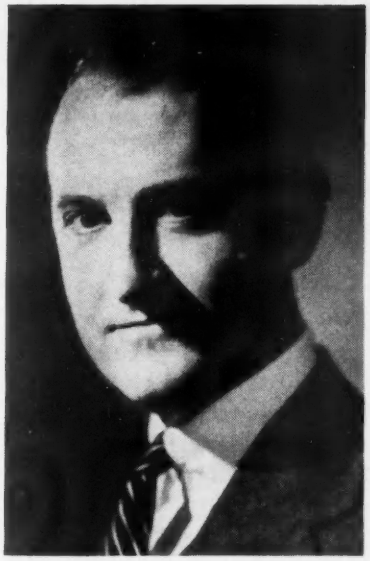
Paystation users will particularly like the lighter, shorter handset of the "80" series paystation. Its lightness means it's far less tiring to hold, and the contours provide an easier grip. Because the handset is shorter, the user can talk directly into the transmitter and slightly to one side. This helps increase the volume and improves transmission quality. The receiver cap fits the ear better, too—helps reduce pickup of room noises.

Another popular feature of the AUTELCO paystation is its springy Koiled Kord. When this cord is extended, and then released, it instantly recoils into place. What's more, it won't ever kink or become knotted. The Koiled Kord is moisture-proof, as well.

FULL RANGE OF COLORS

To all these features the "80" series adds paystations in color. Many telephone companies find that this feature helps "sell" paystation installations in locations where black instruments are not acceptable. Paystations in color are perfect, for example, in beauty parlors, where women have plenty of time to converse. The AUTELCO "80" series paystation may be ordered in any one of 10 beautiful colors used on the Type 80 Telephone: Dawn Gray, Sand Beige, Sunlight Yellow, Turquoise, Camellia Pink, Forget-Me-Not-Blue, Gardenia White, Classic Ivory, Jade Green and Garnet Red. With this wide variety to choose from, you'll be able to select colors that blend or contrast with countless surroundings and help bring in additional revenue.

What a beauty! In this case we're referring to the new AUTELCO "80" series paystation, shown here in Classic Ivory. The paystation is available in 9 other colors and has the famous Type 80 Telephone features.



JOHN B. PRIZER, vice pres., Pennsylvania Railroad has been named a director of General Tel. System.

a former vice president of the U. S. Chamber of Commerce.

Brorein has been president of the Florida State Fair and Gasparilla Association since 1938. He is widely active in local and national Boy Scout activities. During World War II he served as consultant in the communications branch of the War Production Board.

Prizer, a native Pennsylvanian, was graduated from Harvard University with Phi Beta Kappa honors in 1934. He received an M.A. degree from Cambridge University in 1936. Later in 1936, he joined the Pennsylvania Railroad as assistant solicitor.

He resides in Philadelphia and is widely active in community, state and national business, civic and philanthropic affairs. He is chairman of the board of corporators of the Woman's Medical College of Pennsylvania and is chairman (and former president) of the English Speaking Union of Philadelphia. He is a member of the boards of the World Affairs Council of Philadelphia, the Harvard Alumni Association, Community Nursing Service, the Saving Fund Society of Germantown, and numerous other educational, law and charitable organizations.

Diamond Jubilee Convention

Plan to Attend USITA'S 60th Anniversary Convention, at Conrad Hilton Hotel, Chicago, October 14, 15, 16.

Announcing the New

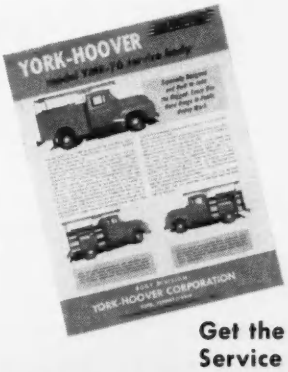
YORK-HOOVER

model YMR-76 service body

Designed and Built to perform Service Jobs Faster, Safer, more Economically for You!

MODERN – PROVEN – EFFICIENT

- The Model YMR-76 is designed to provide more space for the convenient carrying of materials and tools. A thru material drawer in rear compartment and a thru compartment at front is particularly useful in addition to other specialized cabinet arrangements.
- "Custom" construction features include four sturdy cross members beneath the steel treadplate floor for greater base stability . . . a deep drop gate at the rear, especially designed to prevent sagging . . . easy-action telescoping roof . . . and double panel compartment doors incorporating galvannealed non-corrosive steel.
- Invest in the model YMR-76 service body. It's new—modern—proven—efficient. It will provide trouble free service over a long period of years for you!



Get the complete story on the York-Hoover YMR-76 Service Body. Write for Bulletin No. 942 Today!

BODY DIVISION

YORK-HOOVER CORPORATION

YORK, PENNSYLVANIA

Creative Engineering for the Public Utility Industry Since 1892

construction and maintenance DIGEST

- More protection than ever
- Profitable noise
- Wires' Shangri-la
- Real cool sitting
- 3 ways better
- Plastic armor
- Keep the charge
- Pennies for power
- No more messenger
- Most for least

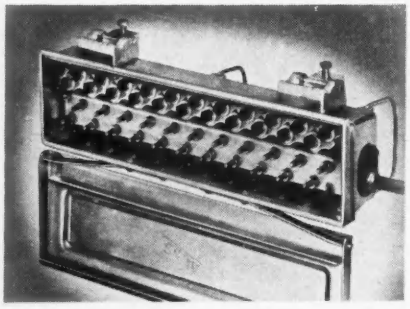
Published regularly to help you get the most out of your materials and supplies dollar

by John W. Garbutt, Inside Sales—Rochester

As a volunteer fireman I have to be alert at all times, just as Stromberg-Carlson is always alert to meet your supply needs. We're "on the job" for you 24 hours a day—because telephony is our full-time job, not just a sideline. Every order we fill for you brings you fine products, protected by a double guarantee—ours, and the maker's. And the attention given to your order is as careful as if our total program depended on it—because it does! Your supply business makes possible the research program that discovers new and better telephone equipment—to serve you. It's a pleasure to be working with you—we sincerely appreciate your support!

Terminal with New Protector

Now get more dependable protection than ever for station or cable—with Reliable Electric Company's strand mounted terminals.



Precision manufactured terminals of highest quality

These terminals are equipped with the new Reliable Fuseless Protector Unit, which dissipates static discharges across elements to ground.

Another important feature is that the silicon bronze binding posts on which cable stubs are terminated are sealed with the wires in a glass-reinforced polyester resin of exceptionally high dielectric qualities.

Surface leakage is minimized or completely eliminated by 1-1/16" spacing of binding posts.

Noise can be money!

Take a business subscriber who has a telephone in some extremely noisy location—and who has finally decided to do something about it. Would you rather have him spend money in building a soundproofed booth—or give **you** the money as monthly income on a telephone which completely licks the noise problem?

The GAI-PHONE is such an instrument. It has a special transmitter that actually creates a "Zone of Quiet" around the handset—even in a spot as noisy as a boiler factory!

It costs the subscriber **less** than a booth—and you get the revenue!

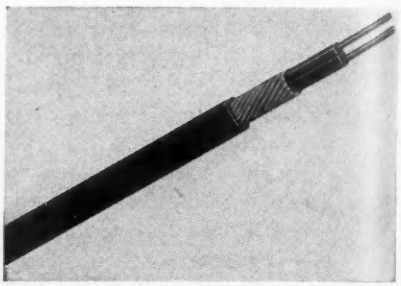
Ask us for complete details.

Here's a drop wire that hides its age

Samples of Teleprene® (neoprene jacketed) drop wires were strung where they would get lots of weather. After nine years, they still looked fresh and undaunted—and tests showed that these wires would give years and years **more** of good service!

The jacket is a tire-tread type neoprene compound which provides excellent resistance to sunlight, abrasion, oils, acid fumes, alkalies and other corrosive chemicals.

Conductors have Teleplate coating: lead, to resist corrosion, and brass plating over the lead, to provide enduring adherence of the high quality buna rubber insulation to the conductor.



Available in parallel (shown here), twin parallel and twisted pair types.

Cane-seat chair keeps operators cool, comfortable

Making the operator as comfortable as possible may not strike you as a "maintenance" problem — yet your service is much smoother when the girls are cool and relaxed.

This operator's chair has a cane seat, which is much cooler, cleaner and more comfortable than other types. It retains all the posture advantages for which Sturgis is famed. It is called the Sturgis SC-240.

The posture-curved, well-cushioned backrest is covered in genuine leather.

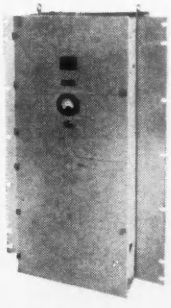
The exclusive Sturgis "Follow-Flex" feature automatically adjusts to the operator's every movement, supports her restfully all the time, discourages fatigue, keeps her at top efficiency.

Other new and welcome features include a plastic-coated steel foot ring which retains its color, and a handy purse holder, available on request. Six seat heights, all adjustable.

Fast delivery available from your Stromberg-Carlson supply representative.

Raytheon Rectricharger® Battery Chargers—Complete Line 3-400 Amperes

Entirely redesigned new Raytheon Rectichargers offer three major improvements:



New Raytheon battery chargers feature ±1% no-load to full-load regulation

1. ±1% no-load to full-load stabilization prevents battery overcharging, minimizes gassing, lengthens battery life.

2. No audible hum at output terminals.

3. Most compact units on the market—wall or rack mounted.

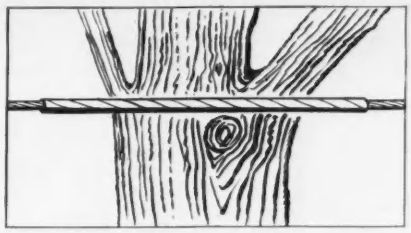
Automatically compensated for rectifier aging, Rectichargers offer high efficiency, completely automatic regulation. No moving parts and self-protecting circuitry assure minimum maintenance, long life. Single and three phase, 3-400 amps.

Built by Raytheon, supplied to you by your Stromberg-Carlson representative.

Long-lasting protection at low cost

You get effective, long-lasting, inexpensive protection of covered cables or conductors with Preformed Plastic Line Guards.

Easily installed by hand, these line guards protect against abrasion by trees, buildings and other obstructions. They fit as securely as metal line guards.



Standard stock sizes in 6-foot lengths. Other lengths available on order.

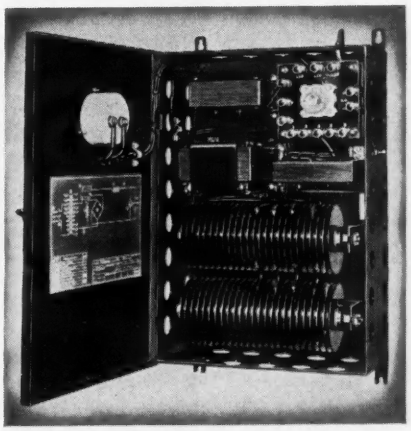
PLP Plastic Line Guards are available from stock in standard 6-foot lengths. Or you may order them in 3-foot, 9-foot and other sizes.

Your Stromberg-Carlson representative can offer prompt delivery on your order.

Here's a charger that adjusts itself to match battery drain

Daily load demands can vary all over the lot. That's why you need a battery charger that adjusts its output automatically to maintain your batteries in peak condition.

Such a unit is the Schauer Automatic Battery Charger. That word "automatic" is a most important part of its name. The Schauer Charger will maintain a charging rate in proportion to the drain on the batteries within its rating.



A self-regulating battery charger that keeps your storage batteries in top condition and prolongs their life.

The Type RB illustrated is completely automatic, with no relays, vibrators or tubes requiring attention or adjustment. Entirely noiseless, it continues to charge even while the telephone system is operating—with no hum or interference.

Write for complete specifications on the completely automatic Schauer Battery Charger.

Battery has lowest yearly cost

There's an easy way to save money on switchgear, signal and alarm systems or emergency light and power applications.

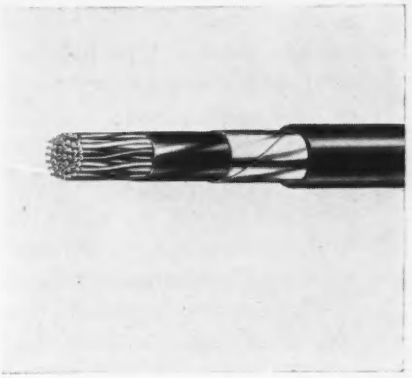
Gould Planté rolls up excellent service records—cuts maintenance to a minimum.

Amazing service records have proved that Gould Planté batteries have the lowest yearly cost of any battery you can use. Pure lead positive plates help make this possible.

For top operating economy, ask your Stromberg-Carlson representative for Gould Planté—the Aristocrat of Stationary Batteries.

Economical 775-P-SS Self-Supporting Telephone Cable

Low Cost SS Cable With Dependable, Long Life



Available in 6, 11, 16 and 26 pair

This Ansonia Wire & Cable Company product offers finer electrical characteristics than any other comparable cable.

(*Continued on page* 102)

(*Continued from Page* 101)

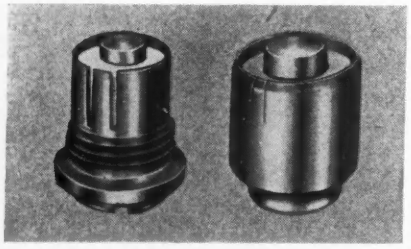
construction and maintenance digest

In outside plant construction you can eliminate messenger and associated hardware by using light, flexible Ankoseal Type 775-P Self-Supporting Cable.

Its 19 gauge medium-hard copper conductors are individually insulated and paired with systematically varying lays to eliminate crosstalk. Aluminum tape sheathing and plasticized jacket provide excellent protection against weather.

Arrester gives maximum protection

With the Cook Mytigap Arrester you get the utmost in cable terminal and substation protection at low cost.



Mytigap Arresters.

Cook Electric Company's Mytigap is a lightning arrester and power-cross protector in one, featuring self-restoring operation after functioning. It is available in 2 styles: a snap-in type to fit Cook terminals and a type that is made with special screw-type housing for general applications.

Mytigap Arresters require minimum attention or service. Internal parts are readily accessible for easy field replacement if damaged by extreme disturbance.

This arrester represents the most advanced high-potential dischargers for line and cable protection.

Distributed by

STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 6, Chicago 6, Kansas City 8, Rochester 3, San Francisco

Hubbard & Co. Announces Sales Staff Changes

CHANGES in the Northwestern Division sales organization of Hubbard & Co. have been announced by Charles C. Warne, Jr., vice president — sales.

William Calog has been appointed sales manager for the division, and has been succeeded by Edward W. Fitzgerald as district sales manager in Ill. and Wis. Other district sales managers are R. A. Enke, L. A. Ehmsen, F. G. Lanick, J. E. Long, W. E. Stroberg, and G. D. Thorpe.

Roy Peterson has been appointed product manager, lightning arresters and cutouts.

Herbert C. Lansdell, formerly in charge of sales of telephone and railroad equipment, has been named sales administrator of the Midwestern Region, and J. C. Carroll, formerly sales manager of the Northwestern Division, has been named general sales manager, Midwestern Region. The Midwestern Region, which embraces the Northwestern and Southwestern Divisions, was newly-created as part of a change to a regional set-up. It has its headquarters in Chicago. Other regions are designated as the Eastern Region and the Pacific Region.

As part of the change to the regional set-up, the New England area, formerly called the Eastern Division, has been designated the Northeastern Division.

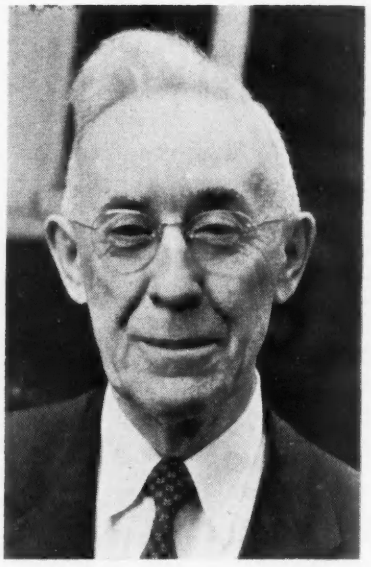
Automatic Electric Supervisor Dies

A HEART attack has claimed the life of L. W. Carmichael, who compiled almost 40 years service with Automatic Electric Co. Mr. Carmichael, who joined the company in 1919, served in production, purchasing and statistical capacities before being promoted to division sales manager for the north central states area in 1939.

Assigned to production control during the war years, he resumed his sales manager position in 1946. In 1953 he was named supervisor of Automatic Electric Sales Corporation's statistical analysis group and held the position at the time of his death.

Harold T. McCaig Dies

SERVICES for Harold T. McCaig, Chicago sales executive for 46 years and a member of the Independent telephone industry since 1902, were



HAROLD H. McCAIG
1883-1957

held in the chapel September 5, at 523 Lake, Oak Park, Ill. Burial was in Mount Emblem Cemetery.

Mr. McCaig, 74, died September 1 at his home, 6937 31st., Berwyn, Ill.

Mr. McCaig was associated with the Stromberg-Carlson Co., for more than 37 years, working first as a "traveler" for that company in the Nebraska and Iowa territories, then as assistant Chicago division manager from 1921 to 1936, and in 1936 as a division manager. He retired from his duties with Stromberg-Carlson on December 31, 1948.

Previous to his association with the Stromberg-Carlson Company, Mr. McCaig was with the Northwestern Bell Telephone Co., for eight years, advancing from installer to special assistant traffic engineer.

At the time of his death, he was sales manager for the Lorain Products Co., of Lorain, Ohio.

Mr. McCaig was a life member of the Independent Telephone Pioneer Association and was well known to telephone men throughout the nation.

Surviving are the widow, Helen; a son, Harold T. Jr.; a daughter, Mrs. Judith E. Schmidt, and a sister, Imogene.

GLADWIN PLASTICS PROUDLY ANNOUNCES

The "BOOTHETTE"

REVENUE PRODUCER

Most brightly lighted coin station now available. Attractive, neat, clean design. No metal corners to obstruct view of coin collector. Directory "REPLACE" sign gets directory back in the holder. White plastic dome with red letters draws attention from afar.

ENGINEERED BY THE TELEPHONE INDUSTRY

Coin collector mounts on hollow steel shaft welded to steel base. Conduit in hollow shaft for electrical service and separate conduit for telephone service. False bottom hinges downward for ease of servicing protector and sub-set. Steel pedestal, steel bracket.

ECONOMICAL—TO CUT COSTS

Inexpensive initial cost. All component parts replaceable, economically priced and immediately available. Shipped ready for installation; no assembly or set-up cost. Can be transported to installation site in automobile! Ideal for temporary locations.

FOR SIDEWALK LOCATIONS

On city streets, pedestal-mounted like parking meters. Wall-mounted for sides of building nooks, or entrance ways. Pole-mounted for city or public service light poles.

FOR DRIVE-IN LOCATIONS

Along highway, roadside parks, off highway locations, on city streets, in auto service stations, restaurant drive-ins, shopping centers, and other revenue-paying locations.

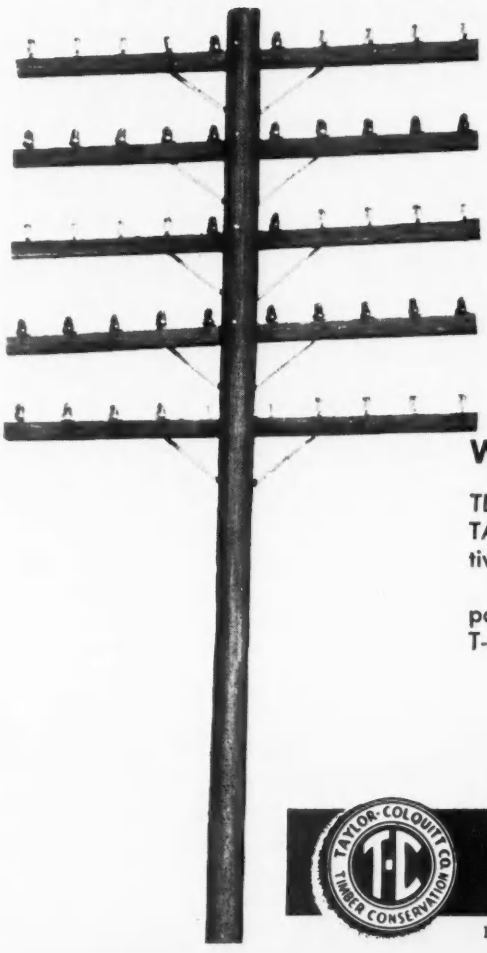
FOR INDOOR LOCATIONS

A more attractive BOOTHETTE requiring less space will get a better location and more revenue. Ultra-styled in unlimited decors. Plastic housing available in all colors.

WRITE FOR NEW "BOOTHETTE" BROCHURE

GLADWIN PLASTICS INC.

165 COURTLAND ST., N. E. **ATLANTA, GA.** **PHONE JAckson 5-5384**



REDUCE POLE REPLACEMENT

WITH T-C PRESSURE-TREATED POLES

TELEPHONE COMPANIES have an enormous stake in wood . . . TAYLOR-COLQUITT helps protect this investment by providing effective preservative treatment for poles.

TAYLOR-COLQUITT assures you year-after-year protection for poles. Make your poles last longer and reduce replacement — specify T-C Pressure-Treated protection.

DISTRIBUTED BY AUTOMATIC ELECTRIC SALES CORP.
AND LEICH SALES CORP.

TAYLOR - COLQUITT CO.
SPARTANBURG, SOUTH CAROLINA

PLANTS AT SPARTANBURG, SOUTH CAROLINA AND WILMINGTON, NORTH CAROLINA

THE NEW
Comptometer® Customatic
HAS MORE!

MORE for the operator
in new features, beauty, ease of operation!

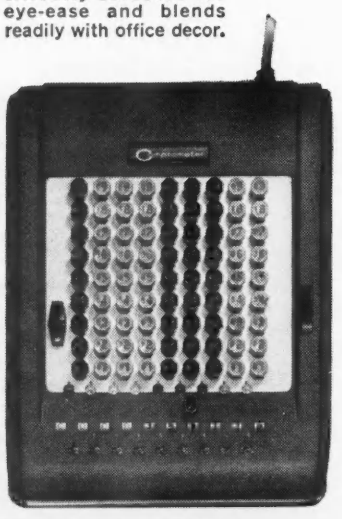
MORE for the boss
in new features that mean low-cost, time-saving accuracy!

The New Comptometer Customatic gives you everything you've learned to expect from Comptometer—plus these 3 new features.

NEW CUSTOMATIC KEY CONTROL operator simply adjusts new control to suit her own individual touch.

NEW INSTANT ELECTRIC CLEARANCE a touch of the bar and the dials are cleared, electrically.

NEW COLOR—smart, restful Diamond Gray, scientifically selected for eye-ease and blends readily with office decor.



It's the cost per calculation that counts!
Comptometer's famous features enable you to get MORE AND BETTER work, at less cost!

Accuracy Key insures complete registration.

Easy-to-Read Large Answer Numerals show through apertures shaped to reduce glare. All ciphers to left of answers are eliminated.

Direct-Action Keys give lightning answers. No levers, cranks, or extra operations.

Cushioned Touch—Built-in floating action eliminates "finger-fatigue."

You will appreciate the New COMPTOMETER CUSTOMATIC only when you see it in action.

Let us prove this in your office FREE.

Comptometer® Corporation / BETTER PRODUCTS TO BETTER BUSINESS

Comptometer Comptograph "220M"—with new multiplication key—more features than any other 10-key listing machine. Mail coupon.

Comptometer Commander—Insures accuracy in dictation. Lifetime Magnetic belt saves far more than machine costs. Try it today, FREE.

Comptometer Corporation
1738 N. Paulina St., Chicago 22, Ill.

In Canada: Canadian Comptometer, Ltd.
501 Yonge Street, Toronto 5, Ontario
☐ Arrange free office trial for me on:
☐ Send me literature on:
☐ Comptometer Customatic
☐ Comptometer Comptograph "220M"
☐ Comptometer Commander

Name .....
Firm .....
Address .....
City ..... Zone .. State .....

Ansonia Telephone Cable On Duty At South Pole

IN ANTARTICA, dependable telephone communications are an essential. The safety of armed forces personnel, scientists and other civilian

ED W. MOST, official observer and electrical engineer at Little America for Bureau of Yards and Docks, U.S.N.

observers, as well as millions of dollars worth of critical material, depends on the accurate transmission of instructions and information.

The Ansonia Wire & Cable Company is doing its part to make "Operation Deep-Freeze" an unqualified success. Ankoseal rural distribution wire, Type 619, provided by Ansonia is being used for telephone, intercom and control circuits. Versatility of installation is apparent everywhere. It may be seen hanging from the rafters in the network of snow covered tunnels connecting all buildings; from pole to pole outdoors; and even simply laid on the snow covered ground.

Ed W. Most, official observer and electrical engineer at Little America for the Bureau of Yards and Docks, USN, has informed Ansonia that "considerations in selecting Ankoseal rural distribution wire included quick installation, fast and easy maintenance, adaptability to emergency service."

Earl Van Wie Receives Kellogg Switchboard Award

EARL VAN WIE, supervising wire chief of the Southern Nevada Telephone Co., Las Vegas, has received the first national award of Kellogg Switchboard & Supply Co., a divi-

sion of International Telephone & Telegraph Corp., for "technical contribution advancing the art of telephony."

Van Wie's contribution was an engineering change in the Kellogg dialing equipment which reduces waiting time for the dial tone. This, in effect, increases the traffic capacity of the system.

When a receiver is lifted from the telephone, the dial equipment in the central office identifies the line and then sends the dial tone to the calling party. Van Wie's plan — which saves one second every time a receiver is lifted — has the effect over a 24-hour period of making available 4,000 additional minutes of equipment usages for other calls.

A cash award was presented to Van Wie personally by the president of Kellogg, George T. Scharffenberger, during a recent visit to Las Vegas.

R. L. Feistel Joins Budelman Radio Corp.

WILLIAM E. FINGERLE, JR., president of Budelman Radio Corp., Stamford, Conn., has announced the

ROBERT L. FEISTEL

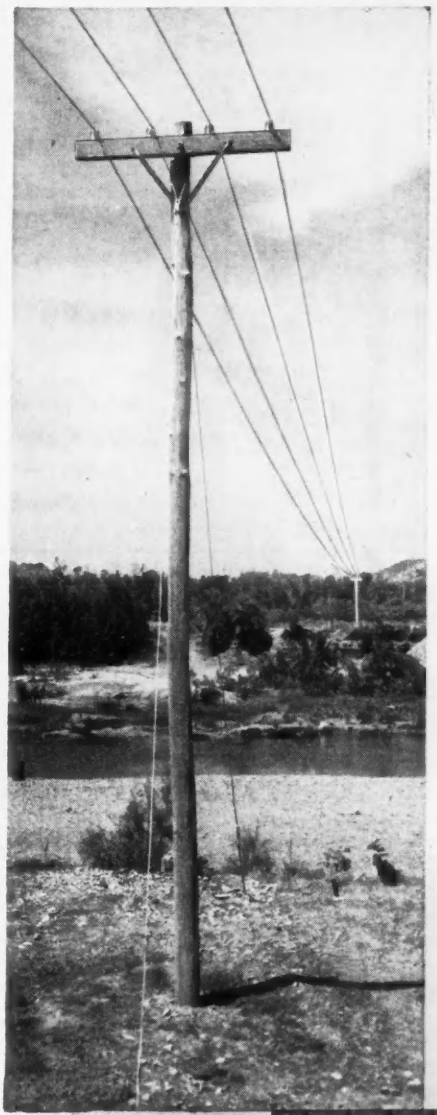
appointment of Robert L. Feistel as general sales manager in charge of export as well as domestic sales.

Prior to joining the Budelman Radio Corp., Feistel was vice-president of French-van Breems, Inc., an electronics and aviation export firm, and before this he was sales engineering manager of the Link Radio Corp. He was previously associated as sales engineer with Radio Engineering Laboratories.

Crapo HTL-195

FOR EXTRA LONG SPAN RURAL LINES

The *NEW* *LOWER* Resistance Extra-High Tensile Line Wire



- **Better Voice Transmission**
- **Spans to 600 Feet or More**
- **Savings in Material and Labor**
- **Lower Ultimate Costs**

Superior voice transmission qualities and extra high physical strength are combined in ***Crapo*** HTL-195 to provide the most practical and economical of conductors for rural telephone circuits.

This new, lower-resistance steel line wire, with a minimum breaking strength of 1800 pounds, makes possible spans to 600 feet in Heavy Loading, 650 feet in Medium Loading and 700 feet in Light Loading areas. Where terrain and other conditions permit the use of extra long spans, this means a 40% reduction in pole structures. The savings in materials and in construction costs will be apparent.

Before building new, or replacing old rural lines, investigate the possibilities of ***Crapo*** HTL-195! Write for complete information, including Manual of Engineering Data, No. A-195!

Pioneers in the development of high tensile and extra-high tensile steel line wire, and associated products, for the telephone industry.

INDIANA STEEL & WIRE COMPANY, INC.
MUNCIE, INDIANA

THE CLEARING HOUSE

Published in each issue of Telephone Engineer & Management. Advertising forms close on 1st & 15th of month. Rates 15 cents a word except for Situation Wanted ads, which are only 10 cents per word. In figuring cost of ads, count each word of address in number of words used. All ads payable in advance. Minimum charge—$2.00. Special rates for display ads on request. Send copy and box number replies to Telephone Engineer Publishing Corp., 7720 N. Sheridan Road, Chicago 26, Ill.

HELP WANTED

SALES REPRESENTATIVE to travel southern territory, Will handle well established product with limited competition. Must be able to talk to executives and engineers of both telephone and power companies and work with jobbers. Should have knowledge of up to date outside plant construction, also sales experience. Salary open. Include full resume of education and experience with reply to Box 9073 c/o Telephone Engineer and Management, 7720 N. Sheridan Road, Chicago 26, Illinois.

SALESMAN wanted to travel midwest territory. Must be experienced. Should have good grounding in outside plant. Young company. Lots of opportunity for right man. Salary open. Include all particulars with reply to Box 9074, c/o Telephone Engineer and Management, 7720 N. Sheridan Road, Chicago 26, Ill.

CABLE SPLICERS, Station Installers. Equipment Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 1211 Kenmore Avenue, Elkhart, Indiana, or 6100 N. 20th St., Philadelphia, Pa.

CHIEF OPERATOR — Familiar with intertoll dial, capable of supervising entire traffic department, Southern state. Write Box 9076, c/o Telephone Engineer Publishing Corp., 7720 N. Sheridan Road, Chicago 26, Illinois.

WANTED: Man with two or more years experience in Traffic Department to develop as an assistant to Traffic Superintendent. Some technical knowledge of central office equipment desirable but not essential. Large telephone company in the southwest. Good wages and working conditions with employe benefits. For interview write, Box 9069, c/o Telephone Engineer Publishing Corporation, 7720 North Sheridan Rd., Chicago, Illinois.

PLANT ENGINEERS — For large Independent Telephone Company. Some experience necessary. In reply state age, educational and employment history. Address reply to Personnel Supervisor, Rochester Telephone Corporation, 10 Franklin Street, Rochester 4, New York.

WANTED
TELEPHONE ENGINEER
PLANT SUPERINTENDENT

For a growing telephone system in the Southeast. Must be familiar with all phases of telephone engineering. Send resume of education and experience to Box 9077, c/o Telephone Engineer Publishing Corp., 7720 N. Sheridan Road, Chicago 26, Illinois.

MANAGER WANTED: Immediate employment to take over operations of recently converted systems of 3 dial units serving 600 stations with 1,000 potential. Propose to add 3 additional units resulting in system total of 2400 stations. Located west central Wisconsin along Mississippi river. Applicant must have substantial management experience in all phase of operations in systems of similar size. Please state basic qualification and salary requirements in first inquiry, application forms will be forwarded on receipt of inquiry. Address: Otto Harder, President, Vernon Telephone Cooperative, Viroqua, Wisconsin.

WANTED TO BUY

INDEPENDENT telephone company will purchase other telephone companies having 2,000 stations or more. Any location. A mutually advantageous purchase agreement can be reached. Reply sending details to Box 9078, c/o Telephone Engineer Publishing Corp., 7720 North Sheridan Road, Chicago 26, Illinois.

DESIRE telephone company of 400 or more stations. Send details to Box 9075, c/o Telephone Engineer Publishing Corp., 7720 North Sheridan Road, Chicago 26, Illinois.

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TELEPHONES

- Leich No. 901 Magneto Desk or Wall Handsets. (reconditioned)
- Western Electric No. 302 Handsets with BIAL straight line ringers. Complete with dials or blanked for dials. (reconditioned)
- Western Electric No. 211-BW-3 Hanger Type telephone sets with dials or No. 211-AW-3 less dials. (reconditioned)
- Automatic Electric Type 40 Monophones with or less dials equipped with 16, 30, 42, 54 and 66 cycle low impedence ringers. (reconditioned)

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BUCKEYE TELEPHONE & SUPPLY CO.

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P. O. Box 5707 Columbus 21, Ohio

FOR SALE

FOR SALE: A. E. Switchboard. Recently removed from service, 440 C. B. lamp ended, lines equipt. 40 Mag. drops, 30 Cord circuits, divided ringing, 2 positions (non-mult.) Board comp. with 3 amp. Rectichargers and 24 V. Batteries, M.D.F. equipt. with prot. for 450 lines. Any reasonable offer takes. Contact: Don Woodard, Mutual Telephone Office, Harlan, Iowa, Phone: SK 5-1237.

STROMBERG-CARLSON XY switchboard wired for 200 lines but equipped for 155 lines. Only 4 years old. Available January 1958, also 800 Stromberg-Carlson 1443 A and 1543 A telephones with SL ringers. Some of the telephones are available now. Write to: Lewisberry Telephone Company, Lewisberry, York County, Pa.

FOR SALE: North Electric Company CX100. Good Condition. 100 lines, 15 links, 5 paystation adapters, 10-2 way dual function E and M signalling trunks, complete with battery rack, power board, charger, MDF and miscellaneous equipment. Reasonable price. Contact: T. J. Schuler, Gen. Tel. Co. of Pa., 20 E. 10 St., Erie, Pa.

STROMBERG-CARLSON, Type 3 Toll Switchboard, 24 positions with 2 panel sections, cord circuits B-34630, wired 10 equipped 8. For immediate delivery. Write: Warren Ritter, Purchasing Agent, Northern Ohio Telephone Company, Bellevue, Ohio.

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SPECIFY TELERING for

Dependable and Economical Telephone Ringing Power Equipment.

Engineered for complete satisfaction.

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SITUATION WANTED

POSITION WANTED: Manager for class C or group of exchanges, dial experience, and ability to engineer dial conversions. Midwest preferred. Write Box #9079, c/o Telephone Engineer Publish-Publishing Corp., 7720 N. Sheridan Road, Chicago 26, Illinois.

Highway Trailer Names New Distributor

UTILITIES Equipment Co., Inc., has been appointed distributor in Tenn., Miss., Ala., and parts of Ark. for the Highway Trailer Co. of Edgerton, Wis., it was announced by E. C. Giddings, vice president-sales.

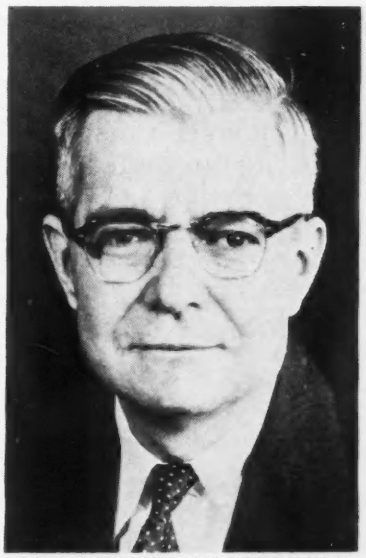
The Utilities Equipment Co. is headed by W. D. Simmonds, president, B. B. Winsett, vice-president, and E. H. Krieger, sales manager.

The management and sales force are well experienced in the utilities equipment industry.

Dr. Willihnganz Assumes New Post At C & D

DR. EUGENE WILLIHNGANZ, noted research authority in the storage battery field, assumed the new post of director of research for C & D Batteries, Inc.

Dr. Willihnganz heads C & D Batteries' new Research Division, because he brings to C & D a 25 year career of research and development work in the battery industry. His work on the theory of negative plate operation in the lead-acid storage battery, and his method of measuring the electrical resistance of storage batteries are listed among some of his outstanding accomplishments, well known to battery engineers everywhere. A considerable proportion of the storage batteries being manufactured today incorporate directly or indirectly the results of his work somewhere in their construction.



DR. EUGENE WILLIHNGANZ

Dr. Willihnganz is a frequent speaker before the Association of American Battery Manufacturers, as well as the Engineering Conferences sponsored by the Power Sources Division of the Signal Corp. He is also a member and past chairman of the Battery Division of the Electrochemical Society.

8,000 Line Cutover Completed at Mansfield

NORTH ELECTRIC's largest contribution to the telephone industry, an 8000-line By-Path Crossbar Automatic Switching System, has been placed into service for the Mansfield (Ohio) Telephone Co.

The Mansfield Crossbar system is the second of this new type of switching equipment to be cut over by North in the past six months.

Utilizing 8000 lines for 22,000 subscribers, Mansfield's new system required the transformation of all telephone numbers to the 2-5 numbering system. This new main exchange is known as the LAfayette exchange.

The new North Crossbar system is designed to accommodate all the forward steps in telephone communications.

Telephone officials discuss new North Crossbar system minutes after Mansfield cutover. Left to right: HANS KRAEPELIEN, president of North Electric Co.; GUSTAV HIRSCH, vice president of Mansfield Telephone Co.; HANS THORELLI, executive vice president of L. M. Ericsson Co.; RUSSELL BUCEK, Installation superintendent, Gustav Hirsch Organization; R. E. JOHNSON, chief equipment manager, Gustav Hirsch Organization; and R. B. WISEMAN, tele phone division manager, North Electric Co.

McCabe-Powers Announces New Hydraulic Hole Digger

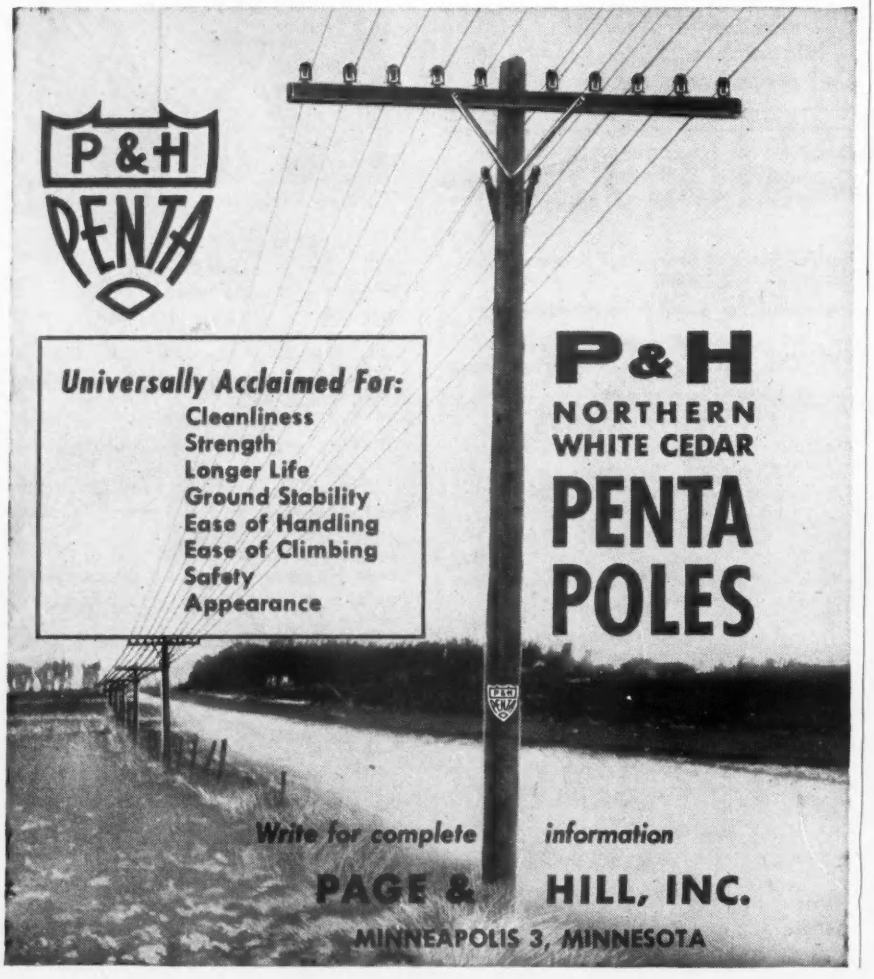
THE ADDITION of a hydraulic hole digger to its Powers-American line of utility bodies and equipment has been announced by McCabe-Powers Auto Body Co., St. Louis, Mo.

The digger, designated "Earth-Master," is suited for use with the Powers-American Series PM-2 "Pole-Master" Hydraulic Derrick, according to Brooke Daly, company vice-president. It can be installed on most "Pole-Master" Derricks now in use, or factory-mounted in conjunction with a derrick and body built to fit individual operating requirements.

Unit is fully-hydraulic in operation; powered by a hydraulic pump driven by the truck engine. It will dig holes up to 9′ 4″ in depth, at various angles, in practically all types of soil. The auger is guided at all times, to assure straight, clean holes. It travels up and down on a twin-column support frame which can be turned to various positions and extended or retracted to fit terrain and working conditions.

Auger is rotated in either direction by a reversible hydraulic motor. It is raised and lowered by a separate hydraulic motor which, in combination with downward thrust that can be applied by the derrick, provides more than ample "down pressure" for digging in exceptionally hard soil. The digger controls are normally installed beside derrick controls in a rear body compartment, to give operator full view of all digger and derrick movement.

Descriptive bulletin #208, with price information, may be obtained from McCabe-Powers Auto Body Co., 5900 North Broadway, Dept. T-E-M St. Louis 1a, Mo.



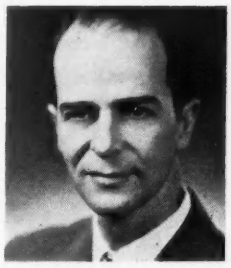
STROMBERG-CARLSON

Transmitter

A DIVISION OF GENERAL DYNAMICS CORPORATION

News and views of Independent telephone people. VOLUME 6, NO. 6 • SEPTEMBER, 1957

Won't you follow us again this summer as we begin.....



George Forbes

The Postman's Holiday—No. 1

For many readers this heading has become a familiar masthead signifying the vacation report of your editor and his family. Informal visits are made to certain telephone companies lying athwart a course which is always a savage race against time, traffic and space.

* * * *

Preparations began early this Spring: for your editor, in a "fireside" chat at T. C. Thompson's home, where "Tommy" proved again how well he remembers his early days as a sales traveler in the Southwest. Followed long evenings at home computing mileage vs. time charts. For the Lady, designing and making a new tent as well as the myriad details which permit the men of the expedition to say, "Mother, where are the woolen pajamas?" and be confident that after weeks of sub-tropical heat they would be available for the Colorado mountains.

"This year I think you had better concentrate in the Kansas City Territory," Tommy had said. And that's a *big* Territory. Full of "Texas" miles, each equal to 1.2 of the standard garden variety such as appear on automobile maps. It had had more than its share of weather this Spring. And I guess it always has had people whose handshake of welcome really grips yours.

June 27th was the circled day. Few neighbors were still up as lights burned late the evening before, or were yet stirring when the parade of luggage resumed in the gray dawn. But Tony Carchedi was on hand to help wedge the last box in place and give us assurance that work at the office would be well handled in our absence.

Westfield, N. Y., was the turn-off where we left our young lady at summer camp. It is also the home of the Nixons, of the Chautauqua & Erie Telephone Company. Fred Nixon and father Sam were out with a contractor, as they are starting an ambitious conversion program including dial and toll ticketing for their six exchanges.

Howard Wright was waiting for us in the hotel lobby in *Ashtabula, Ohio*, busy ore port closest to the Pittsburgh, Youngstown and Warren steel mills. At dinner that night he told us that an additional stimulus to the economy has been supplied by large chemical and ore by-product plants, tool and machine shops. As the city has expanded westward a new subexchange has been built and another is in the planning stage. Of equal importance is the high grade of PBX service which gives each commercial customer the appropriate equipment as soon as his needs are finalized.

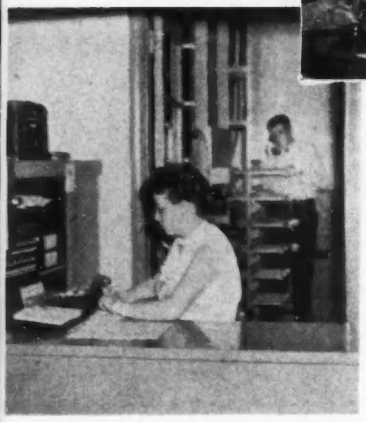
The Postman stops in Ohio,

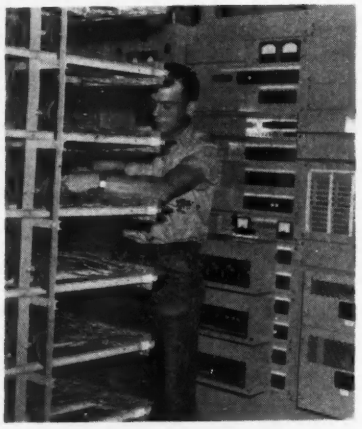
Foursome soon becomes three, as Angeline took counsellor-training at girl's camp on Chautauqua Lake.

An F-40 XY-PBX serves the True Temper tool plant in Ashtabula.

Mr. Howard Wright is general manager of the Ashtabula Telephone Company; Miss Mason, secretary. Below: Business Office, responsible to Mr. Robert Bonner, Commercial Manager.

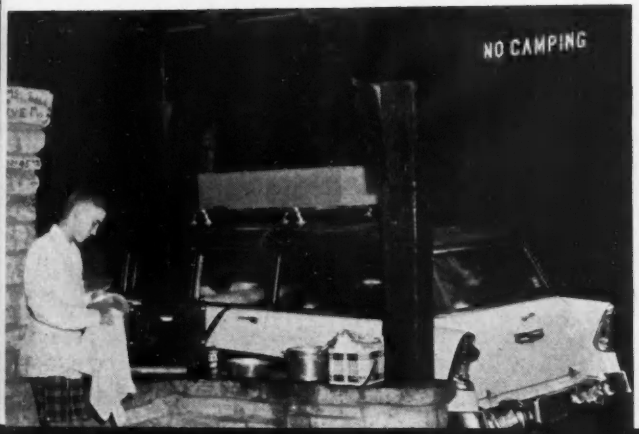
Another fine XY-PBX in Ashtabula, serving the Rockwell Spring and Axle Company.





Dale Reed is wire chief in Buffalo XY Dial office.

If you don't see the humor, the photo is wasted. Heavens opened while cooking breakfast, just prior to striking tent.



Mrs. Paul Drake of Bolivar collects antique china.

Some readers undoubtedly met Mr. Wright at the East Lansing Management Conference. They met a man who has grown up with the telephone business, starting fresh out of high school as maintenance-repairman, and who, in choosing capable assistants, has stepped forward with them to meet the challenge of today's communication pattern.

It rained all across Ohio, bringing the flash floods we had associated with the Southwest. Washouts west of Springfield, with railroad cars hanging over a bank like toys in a backyard model; dirty bilge water pumped from cellars on both sides of the road through Indianapolis; water-skiing over the surface of an inundated cornfield in Illinois. And then the swollen Mississippi — where all this water eventually must come — and Missouri.

Jefferson City was quiet that Sunday noon. Traditional photo of state capital taken, a nice visit with Roeg Cushing to "brush up" on latest developments in his Territory, chicken and mouth-watering homemade bread at a south-side restaurant, and off for our first look at the Ozarks. Lake of the Ozarks must be beautiful, normally; torrential rains had temporarily made it a huge mud bowl, so that our camping site was shifted another 40 miles south to Bennett Spring State Park. Here the Lad broke out his fishing pole; here also I made unwilling acquaintance with chiggers.

It was Mrs. John Gault who welcomed us to *Buffalo, Mo.*, next morning; John was "XY-Schooling" in Rochester. Dale Reed, wire chief, who had previously attended XY Training School, and Ernest Reed, who handles the outside plant, had the situation well in hand. This county seat town, center for dairying and feed crops, was provided with dial service last September — 300 of the 1050 subscribers had never had telephone service previously — and has had a steady growth since. The new plant was engineered by another of the Gault Telephone Fraternity — W. E. Gault of Gardner, Kansas.

Mrs. Gault, like so many telephone wives we have met, has an active part

arrives in Missouri

in company affairs. Much of the attractiveness of the new office reflects her influence . . . "I might as well enjoy the place where I work and meet my friends."

Bolivar is the next city to the west — just far enough to be its own county seat. Paul Drake is manager here, but Paul was also in Rochester.

The story of the Bolivar conversion had just been written, so it was easy to recognize the office with its drive-in cashier's window, and Fred Harkins, retired Bell Company employe who "has tried all kinds and sure likes to work with XY Dial equipment." Mrs. Drake teaches school during the winter, but was there to welcome us to her lovely home where one particular interest is a collection of antique plates.

The Bolivar company is associated with the Inter-County Telephone Company with headquarters in Gallatin, Missouri; all billing for the area is done in that office.

It's a beautiful ride through rolling hills down to *Branson*. Word had come that good swimming was available there, and the Lad kept suggesting a heavier foot on the accelerator. Malcolm Sherwood, once we had made contact at the telephone office, quickly put forward the same idea . . . "You'll enjoy Branson much more after a swim." His son and mine, being right of an age, had a grand evening of it all the way.

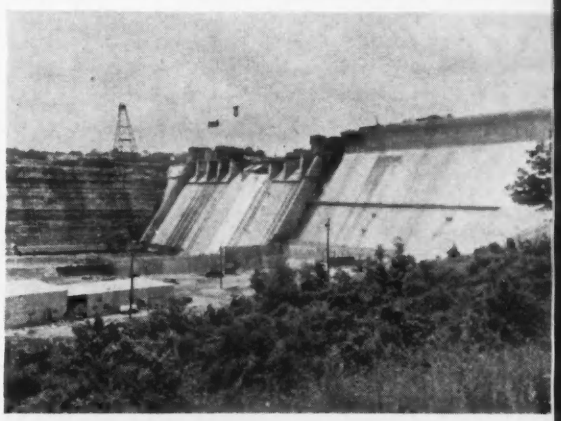
Branson is an old Indian wintering ground. When ice and snow cover the surrounding hills it has always been pleasant here in the valley. Vacationists find it a year-round attraction, although there is a noticeable pickup in visitors during the warmer months when the two huge lakes provide swimming, boating and fishing. The towns of Branson and Forsyth owe their present prosperity to the White River Valley dams, with consistent growth in both transient and year-round population since the first was completed by horse and mule power in 1913. Now Table Rock Dam, 261 feet high and over a mile long, will soon start filling up . . . a power-pool lake covering 50,000 acres and having 745 miles of shore line. Already hundreds of shore sites are being purchased here — the Sherwoods calling theirs a "slanch" (as it's too steep to be a ranch).

"When I converted to XY Dial a little over two years ago I tried to anticipate growth and achieved my 5-year expansion plan ahead of time," said Malcolm Sherwood. "This new development may prove me to be way off base. Looks as though, whether I want to or not, I'm in a *big* business."

Leaving Branson, one turns back the pages of history as he enters the picturesque Shepherd of the Hills Country. All that Nature supplied to the gifted pen of author Harold Bell Wright is still there, unspoiled. Even if the road *were* straight, you'd naturally slow down to the pace that seems appropriate to this vignette of yesterday. But the children of The Hills are very much part of today: they attend the school of the Ozarks, in Branson, where in addition to the craftwork indigenous to the area they learn printing, agriculture and mechanical trades — even to building their own expanding campus. In this conflux of two sharply contrasting cultures we'll take a quiet pause at Uncle Ike's post office before resuming our journey next month.

Mrs. John Gault runs Buffalo business office; attractive color scheme is pleasant background for display of Stromberg-Carlson colored telephones.

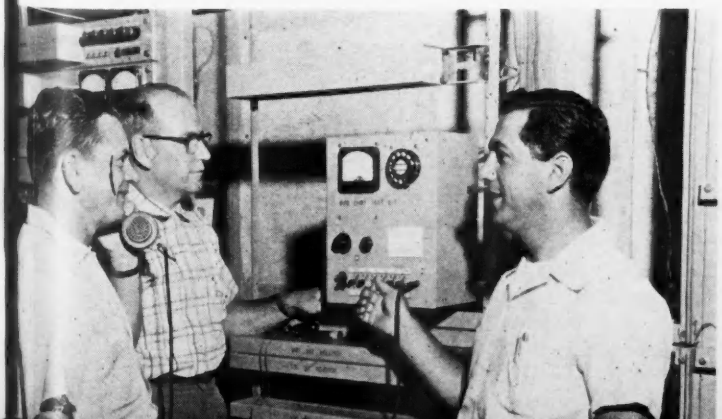
50,000 acres of new lake for Branson vacationists. They say the fish are lining up waiting to get in.



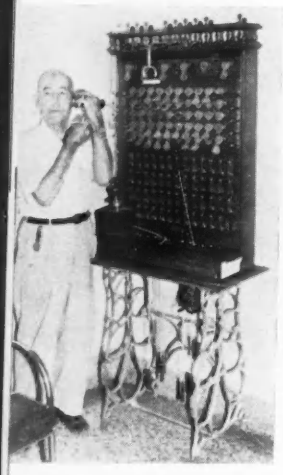
Where the old meets the new. Old post office in the Shepherd of the Hills Country looks down on huge Table Rock Dam now nearly completed.

Below, left. The case of the missing men: Paul Drake (left) and John Gault with Ange Aschettino at XY Training School.

Malcolm Sherwood and commercial office girls at Branson. He's the kind that rides a Jeep, loves to take his boy fishing or talk history or science over after-dinner coffee.



60 YEARS—progress mellowed by memory



1897-
1957

The Navasota (Texas) Telephone Company placed this latest model switchboard in service just as U.S.I.T.A. was being formed. Joe Bednar, still hale and hearty, installed it.

This and other trade publications will have much to say on the significance of these years for Independent Telephony . . . . . phrased by men whose life work has strongly influenced the course of events. The U.S.I.T.A. today, as always, faces forward. Only on special occasions does a backward glance furnish not only a measure of the distance traveled but also a waft of reminiscence which is sauce to the main fare.

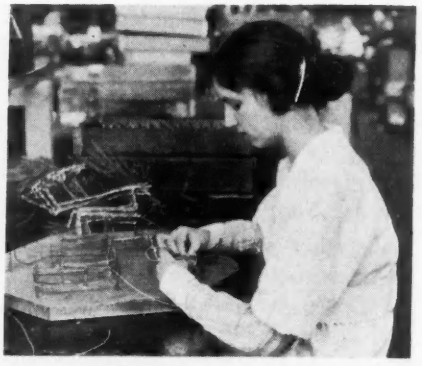
Even as the Association was being formed, a new switchboard was being installed in Navasota, Texas. This summer your editor talked with Joe Bednar, the man who installed it — not for long, as he was in a hurry to make some repairs to the belfry clock in the town building!

A few years later Stromberg-Carlson was to install what was certainly the largest switchboard it had yet built, and among the largest put into service anywhere at that date — the main exchange for the Kinloch Telephone Company in St. Louis, Missouri.

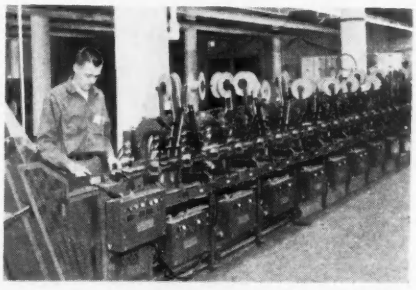
About this time men whose names have become by-words in the telephone industry were becoming associated with Stromberg-Carlson. It seems natural to start with Wesley Angle, who began work as a cable machine helper in 1903 and rose to become President and Chairman of the Board. Many others were recalled in a short visit with George Eyer, recent recipient of a 50-year continuous service pin. Among these were J. A. Helvin, Virginia Gentleman who held the firing line in the Southeast; Charlie Heston who installed the first board in the Dakotas in '99; H. T. McCaig who once "held Iowa in his hand"; W. E. Russell who in 1904 built Stromberg-Carlson's reputation for quality cords; E. A. Hanover whose purchasing policies preserved that reputation for quality; Dr. Ray Manson, Ralph (Cy) Barger; "Tommy" Thompson . . . . the list is long.

R. O. Hoffman also reminisced. "I was lured away from Stromberg-Carlson by $14.00 a week and the glamour of the road. But I could buy a ticket for 21 meals at a clean restaurant for $3.25, and in those days you could 'do the town (Buffalo) for a dollar'." While installing the Newark, New Jersey, office he found room and board for six dollars a week; guests, including ladies and gentlemen of the theatre, sat long after the meal in the vanishing art of conversation.

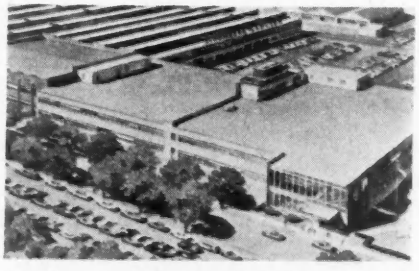
The U.S.I.T.A. looks forward . . . so does Stromberg-Carlson. During the week when the Association marks its milestone, the company most closely associated with independent telephony also celebrates an important event . . . . Family Open House in its capacious new plant.



"Put the nails in the right place — I'll do the rest." This still is accepted method for forming switchboard cables.

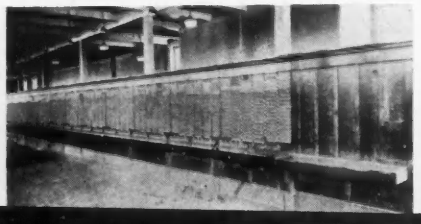


Today at Stromberg-Carlson much of the circuitry is a product of the Automation Department, where printed wiring is an assembly line technique.



Greatly-expanded manufacturing facilities in Rochester opened for Family Day tours during Independent Telephone Week.

Impressive both for its day (1903) or any other time. Stromberg-Carlson central office equipment installed in St. Louis.



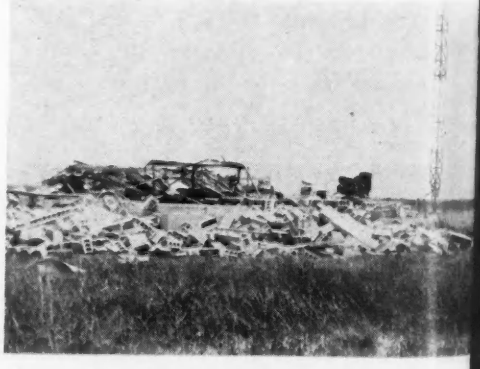
In the same tradition: the helping hand

This is a sequel to the Cameron, Louisiana, story in our previous issue. Jake Torbett of Midwestern Telephone Company, Wright City, Missouri, has a big conversion program under way. He had been counting the days until his Defiance office would also be XY-Dial.

When told of the disaster which nearly wiped Cameron off the map, Jake responded in the "telephone tradition."

"Let them have my Defiance board; I'm glad I can help out this way."

The Cameron folks sure think a lot of Jake Torbett!



Not much for the Henning Brothers of Cameron, Louisiana, to be thankful for until they were offered a complete switchboard by J. C. Torbett of Wright City, Missouri.

Transistorized Amplifier

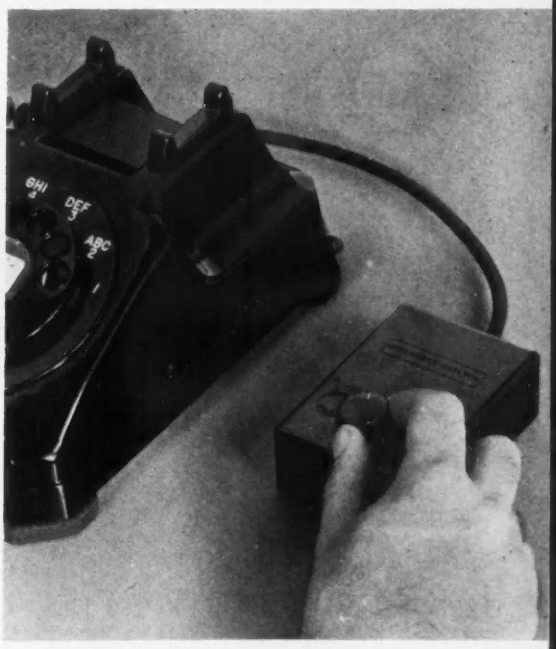
Reports from early users of the Stromberg-Carlson RA-1000 Transistorized Telephone Receiver Amplifier indicate that it is a most satisfactory answer to a problem that has always been perplexing to telephone operating companies. Particularly helpful to subscribers with impaired hearing, this compact device which may be either desk or wall-mounted in any location convenient to the telephone user, provides the means for adjusting the listening level to the subscriber's individual needs.

When the variable volume control is turned to its lowest setting, the output level is the transmission level of the unaided instrument. As the volume control is adjusted upward, gains of up to 16 db under various line conditions and signal levels have been achieved in tests.

The transistorized circuit employing printed wiring assures modest power demands, easily met by central office battery, thereby eliminating any requirement for local battery or commercial power. Maintenance service is rarely required.

A feature commended by telephone companies using this receiver amplifier is the ease of installation, accomplished in a matter of minutes with screw driver alone. No change whatsoever need be made at the central office termination.

Low in initial cost, the RA-1000 is an asset to good public relations, providing a most valued service where it will be most appreciated.



New Receiver-Amplifier is a simple, economical device that provides improved telephone service for people with below-normal hearing. It also boosts signal strength on long loops or conference hook-ups.

United Telephone Company of the West completes

Dial Conversion at Torrington, Wyoming

Torrington, Wyoming, is much more important than its numerical size would indicate. Having visited there it's easy to see why a large exchange, designed and ready for the needs of the future, was planned.

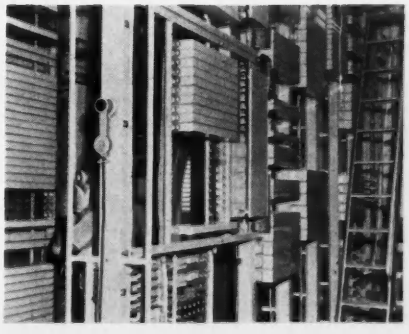
Otto Fuerst, general manager of the United Telephone Company of the West, with headquarters in Scottsbluff, Nebraska, is the "grand old man" of this region — has had an active part in the development of telephone service there for more than half a century. In the extensive conversion program planned for the next several years he is ably assisted by Vernon Allan, assistant general manager; August Burkart, plant superintendent; and Paul Johnson, plant manager for Wyoming properties.

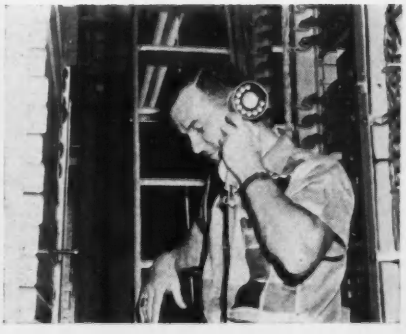
The full story of Torrington and Scottsbluff will appear later in the "Postman's Holiday."

Oops! Wrong wire. 2500 subscribers are depending on the right connections being made here.

Otto Fuerst, right, stands by as Mayor Calhoun of Torrington places first call over dial system.

Chuck Williams, wire chief, hardly shows but he's there completing last minute tests prior to cutover. Vernon Allan is at other end of test patch.





MODERNIZATION SPREADS

Dial Service Inaugurates New Era

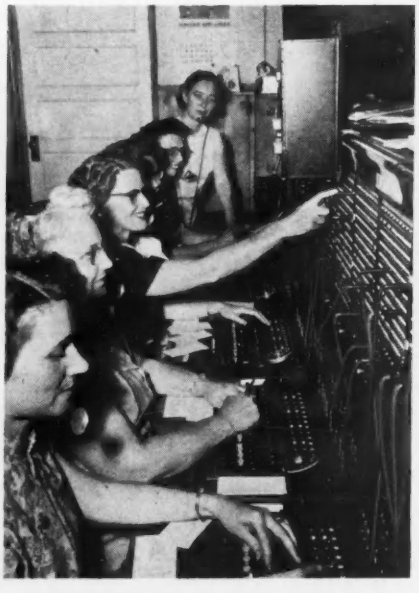
Somebody has just told a good joke . . . or perhaps the broad grins simply reflect a job well done at the Redmond cutover. In either case, the grins belong to (left to right) Ray Crockett, manager, Northwest Telephone Company; Jim Warrick of Pacific Telephone and Telegraph Company; Ernie Austin of Pacific; Dave Balis of Stromberg-Carlson; Jim Wells, president of Northwest Telephone Company; and R. H. Holt, F. E. McGrady, R. M. Smith, installer, and Ernie Larson, all of Stromberg-Carlson.

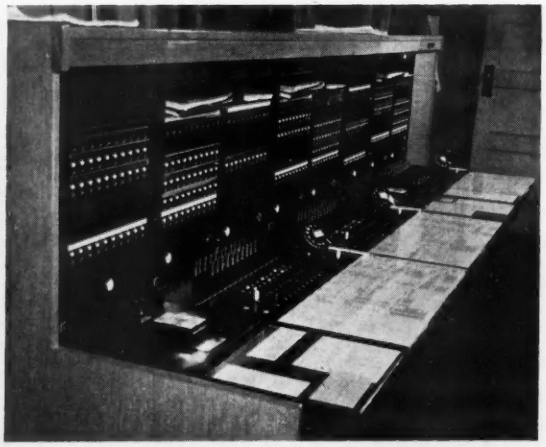
We don't know what the Public Utilities Commissioner from Oregon said to the Governor of the State of Washington, but one thing is certain: it was *how* rather than *what* was said that had a special meaning for the Rose Valley Telephone Company.

The significance of this conversation for the growing independent lies in the fact that it was the very first call to be placed over the new XY® Dial equipment at cutover time in the Scappoose exchange.

Norman A. Howerton, president of Rose Valley and of its parent company, the Ilwaco (Washington) Telephone and Telegraph Company, placed the call. Commissioner Howard Morgan then took over and talked to Governor Albert Rossellini. The conversation marked the opening of a new era for the 300-line, 900-terminal exchange just north of Portland.

The end of an era arrives as operators in Redmond put through the final spate of calls on the old switchboard. Cutover to XY Dial came just after this picture was taken.





A smart, new Stromberg-Carlson toll board stands ready to take over its half of the job in the Redmond exchange.

President Howerton (back to camera) is rewarded with pleased smiles as he presents bouquets to Mrs. Howard Morgan (left), wife of the Public Utilities commissioner, and Mrs. Forrest Sanders, whose husband is Mayor of the city of Scappoose.

DS in busy Oregon

Era in Scappoose and Redmond

The new equipment will make Scappoose accessible to direct distance dialing.

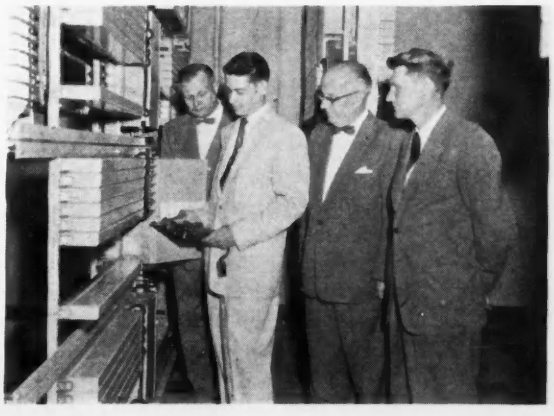
The cutover ceremonies attracted a number of dignitaries. In addition to Mr. Howerton and Commissioner Morgan, there were Mayor Forrest Sanders of Scappoose; Stan Redfern, Rose Valley manager; G. E. Baker, former manager; R. Stewart and Gordon Lake of Ilwaco; W. L. Clark, district commercial agent and E. C. E. Austin, both of Pacific Telephone and Telegraph Company of Portland; Glen Seastrom, Rose Valley equipment man; and E. D. Larson, sales representative, and Ken Sandner, installer, of Stromberg-Carlson.

Rolling Along in Redmond

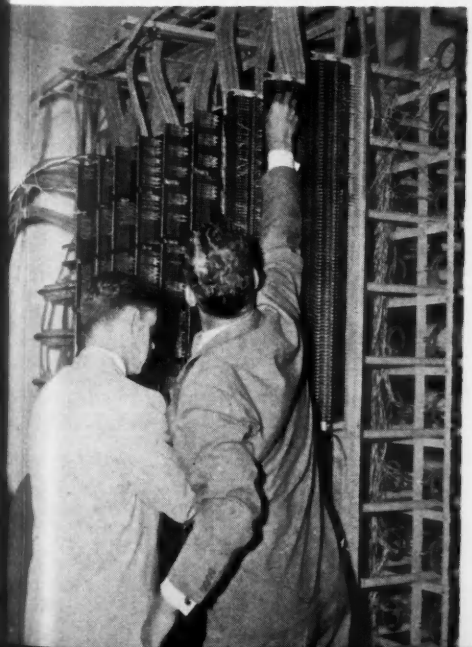
For the Northwest Telephone Company, it was "more of the same" as the firm's Redmond exchange cut over to XY Dial to join its sister exchanges at Sheridan, Willamina and Grande Ronde, which inaugurated dial service last November. Northwest operates a total of six exchanges in East Central Oregon.

Jim Wells, Northwest president, was on hand at cut-over time to enjoy the occasion with company manager Ray Crockett and Lyn Whitaker, also of Northwest. Among the guests were Jim Warrick and Ernie Austin of Pacific Telephone and Telegraph, and a sizeable Stromberg-Carlson delegation which included F. E. McGrady, Dave Balis, Ernie Larson, R. H. Holt, and installer R. M. Smith.

Oregon Public Utilities Commissioner Howard Morgan chats informally with Norman A. Howerton, Rose Valley president, in the Scappoose equipment room.



Installer Ken Sandner points out some of the salient features of the XY Universal Switch to an interested audience composed of (left to right) G. E. Baker, former manager of Rose Valley, president Howerton, and manager Stan Redfern.



Ken Sandner (left), Stromberg-Carlson installer, and Glen Seastrom, Rose Valley Telephone Company equipment man, work shoulder to shoulder on last-minute adjustments.

To Theodore Wells, former president and manager of Northwest Telephone Company, goes the honor of making the first call over the new equipment at Redmond. Northwest President Jim Wells (left) and manager Ray Crockett are standing by.

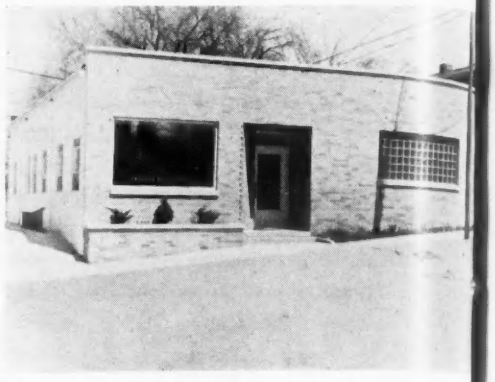
Open House in Crystal, Michigan

Directors of the Crystal Telephone Company go over plans for their open house celebration for subscribers. Seated (left to right) are Andy Sayers, Coyne McCracken, vice-president, Clayton Lechner, secretary-treasurer, and Donald Eldridge, president and general manager. Standing are Robert Boyle and Emerson Eldridge. Al Newburg was not present when the picture was taken.

Subscribers attending the open house which marked the cutover to XY Dial in this Central Michigan community came away fully satisfied that their new dial service is as fine as any in the country.

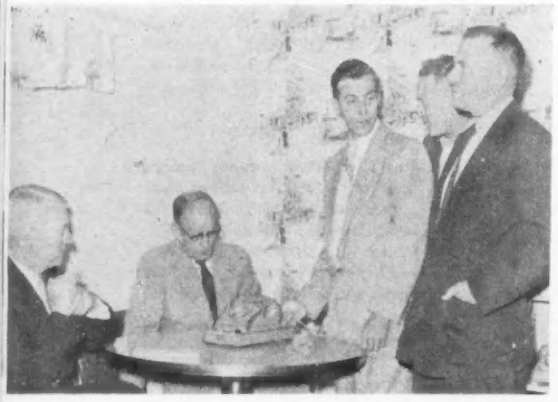
It was a far cry from the first telephone exchange in Crystal, which was operated by Alex McCabe from his drugstore starting in 1905, to the handsome new building and the spanking new XY equipment of the Crystal Telephone Company. The company's Board of Directors earned the plaudits of all concerned for a fine party and a smooth cutover.

Hosts at the open house were Crystal Telephone Company directors Donald Eldridge, who is also president and general manager; Coyne McCracken, vice-president; Clayton Lechner, secretary-treasurer; Robert Bryde, Andy Sayers, Emerson Eldridge and Al Newburg.



Crystal Telephone Company's new building is one of the most modern structures in the area. It houses both the equipment and offices of the company.

Growth is the keynote in Washington State



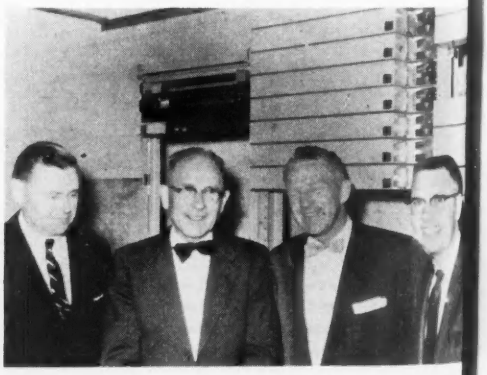
One of the first calls after the Republic and Curlew cutover was to Governor Albert Rosellini of Washington. Listening to the call over a Stromberg-Carlson Hands-Free Telephone are (left to right) Richard Perry, telephone company attorney; Jim Bowlin, REA loan agent; Bob Ditton, company technician; F. E. McGrady of Stromberg-Carlson; and Don Hall of Public Service Commission.

"This progress is still further evidence of the booming growth and importance of the Republic area."

So said a telegram from U. S. Senator Warren G. Magnuson to the Mayor of Republic. Similar sentiments were expressed in wires from Senator Henry M. Jackson and several Representatives.

The occasion for these enthusiastic greetings was the cutover to XY Dial of the Republic and Curlew exchanges of the North Central Washington Rural Telephone Co-op, Inc. The wires expressed what everyone concerned felt: modern telephone service is essential to progress.

Among the notables on hand at cutover time were former company president William Helphrey, who flipped the switch; president Jim Doran; Manager Al Kronschnabel; Don Hall of the State Public Service Commission; and Jim Bowlin, REA loan agent.



Satisfaction in the Republic equipment room at cutover time: Mayor Robert Patterson is at the far left, and the smiles belong to A. L. Kronschnabel, manager; F. E. McGrady of Stromberg-Carlson; and W. J. Stenehjem, engineer of K. P. Kenworthy Associates.

Here is one burial that brings no sorrow to anyone. Al Kronschnabel, manager of the North Central Washington Rural Telephone Co-op, Inc., digs the grave of the outmoded telephone service of the past. After the ancient instrument is laid to rest, the "grave" will be covered with a concrete slab and a bronze plaque will be mounted on the wall above.

Stromberg-Carlson
Transmitter
Published by THE TELECOMMUNICATION DIVISION
STROMBERG-CARLSON
A DIVISION OF GENERAL DYNAMICS CORPORATION
Rochester 3, New York
GEORGE B. FORBES, Editor

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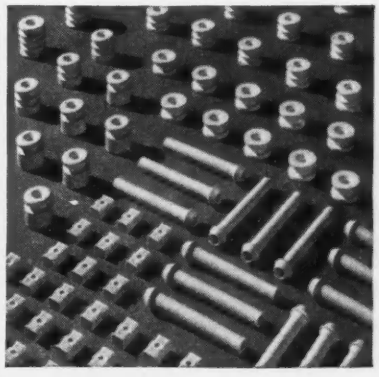

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FINDLAY, OHIO

THE BACK OF THE BOOK

By JOHN G. REYNOLDS

Directory First

SOME SORT of a record fell by the way last month when the new Columbus, Ga., telephone directory came off the press with "X" marking the previously unused spot.

For the first time in the memory of Columbus telephone executives, a name is listed under that letter, and it took the cooperation of the Vietnam and United States Armies to make it possible.

The only listing under "X" is Lt. Bui Xuong, who came to the U.S.A. as an Allied student officer and remained at Fort Benning as an interpreter.

Lt. Xuong said his name was pronounced "Booey Soong." He said he had lived at Columbus for almost two years, but had not previously had a telephone.

How long Columbus will have an "X" listing in the phone directory is not definite. Lt. Xuong is in the Vietnam Army and says he will stay there until he is transferred.

"Safe At Last"

IT TOOK time but last month the American Telephone & Telegraph Co. finally obtained registration of its familiar blue bell as a service mark. In one form or another, it has been used since 1889.

The company had to surmount, two stumbling blocks. First, it paid $18,000 to Raymond L. Smith and his wife, operators of a Washington, D. C. telephone answering service to abandon a mark they had registered. The mark displayed a bell and handset encircled by the words, "The Bell Answering System."

Then, after A.T.&T. had filed its own application, the Patent Office found a conflict with two trademark applications filed by Bell Sound System, Inc., Columbus, Ohio. The "interference" proceedings that followed were recently decided in favor of A.T.&T.

"Shark In A Booth"

WE'LL admit it sounds a bit fishy but our England correspondent tells us a woman recently complained to the telephone company at West Looe, that a shark was monopolizing the public phone booth near her house.

A trouble-shooter was sent to investigate and he found that the booth was indeed occupied by a shark — a five-footer well along in rigor mortis. Police speculated a visiting fisherman had mislaid it.

Timely Reminder

THE SIGHT of Niagara Falls hit home with a woman visitor last month. Our informant tells us she took one look at the Falls, rushed to a phone, made a long-distance call to the Kalamazoo, Mich. fire department and dispatched a fire crew to climb into a window and disconnect the electric coffeepot she'd forgotten to unplug when she left on her vacation. The crew found the coffee boiled away, no damage.

"Two Girls — One Phone"

THE TELEPHONE was featured in a New York City court last month as a model who said the telephone "is her only vice" and an actress who called it her "lifeline" went to court in a row over the phone in the apartment they share.

"The phone is my lifeline," said one of the girls. "That girl was constantly on the phone."

"Some girls like to drink and go out on dates," explained the other, "I don't. My only vice is using the phone."

The girls' phone bill for May and June totaled $328.

Presley Dodges Phone

GETTING rock 'n' roll singer, Elvis Presley on the telephone is just about equivalent to climbing Mount Everest — his number at Memphis, Tenn., is unlisted, and only two or three friends are let in on the secret.

But while Elvis is at peace in his newly-acquired southern-style mansion, 31 other Presley families are finding themselves harrassed daily.

The calls are mostly from teen-agers, but elder folks try to get in touch with the singer, too.

"Being the first Presley in the telephone book, I get a large share of the calls," Mrs. A. W. Presley said. "Even when the caller is convinced Elvis doesn't live here, the party insists 'you are probably a cousin and know where I can locate him.' "

Mrs. Presley said she has even received collect long-distance calls from Texas, Florida and California. Many insist, "Aw, c'mon, we know Elvis is there," she said.

James T. Presley said the number of calls aren't what they used to be. "They would ring my number at least once a night," he said, "and would often wake me up at 2 or 3 a. m. I can always tell when Elvis is in Memphis because the calls start coming in again."

Mrs. H. P. Presley, thinks Elvis "ought to put up with what we other Presleys have to put up with. It isn't so bad when the callers are nice or don't call in the early hours," she said. . . . "I don't have anything against the boy, but I do wish there was some way for his callers to call him and not me."

You can see why linemen prefer

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Made in accordance with or for use under U. S. Patent No. 2,761,273; other patents issued and pending.

mad ?

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Today, we do a complete directory job for independent telephone companies in 4400 communities . . . save them time and worry while revenues go up.

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